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Bulletin of the British Ornithologists' Club

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Volume 128 No. 1
March 2008

MEETINGS are normally held in the **Sherfield Building** of **Imperial College**, South Kensington, London SW7. The nearest Tube station is at South Kensington; a map of the area will be sent to members, on request. (Limited car parking facilities can be reserved [at a special reduced charge of **£5.00**], on prior application to the Hon. Secretary.)

The cash bar is open from **6.15 pm**, and a buffet supper, of two courses followed by coffee, is served at **7.00 pm.** (A vegetarian menu can be arranged if ordered at the time of booking.) Informal talks are given on completion, commencing at about 8.00 pm.

Dinner charges are **£22.50** per person (since 1 January 2007).

FORTHCOMING MEETINGS

See also BOC website: **http://www.boc-online.org**

Unless advised to the contrary, the meetings for March, April, July and September will be held in the Rector's Residence of Imperial College, 170 Queen's Gate, South Kensington.

11 March 2008—Lars Svensson—*Warblers in the Caucasus*. Lars Svensson is the author of Identification guide to European passerines (1992), co-author of *Collins bird guide* (1999), and *Philip's guide to birds of Britain and Europe* (2007). He has written numerous identification papers, and published *Soviet birds* (1984; a cassette with recorded bird voices) and *Fågelsång i Sverige* (1990; 'Bird Song of Sweden', a CD and booklet treating 90 common Swedish species). Editor of *Vår Fågelvärld*, the periodical of the Swedish Ornithological Society, 1971–74, he founded the Swedish rarities committee and was its chairman 1972–86. He has been a member of the Taxonomic Sub-Committee of the British Ornithologists' Union since 2005 and has conducted extensive taxonomic research in museum collections and in the field. Lars is also an 'Honorary Ringer' of the British Trust for Ornithology, holds an honorary doctorate from Uppsala University and is an honorary member of the Spanish Ornithological Society.

Applications to Hon. Secretary (address below) by ***26 February 2008***

29 April—Annual General Meeting at 6.00 pm, followed by a **Club Social Evening**. There will be no booked speaker, but members are invited to bring along one or two slides, a short PowerPoint presentation or a specimen (!) of a bird or ornithological subject of topical interest, and to speak **for not more than 5–10 minutes** about it. The aim will be to generate discussion and to facilitate the exchange of information between members.

Applications to. Hon. Secretary (address below) by ***15 April****, including subjects to be raised and any special facilities (e.g. a laptop computer) required*

The following dates have been selected for the remainder of 2008:

21 June (Saturday from 10.00 am)—a special extra meeting at Tring Museum. During the visit, the Revd. Tom Gladwin will talk about the naturalist, Alfred Russel Wallace (1823–1913)
8 July—speaker to be confirmed
23 September—Richard Price—*Birds of Morocco*
4 November—speaker to be confirmed

Overseas Members visiting Britain are especially welcome at these meetings, and the *Hon. Secretary* would be very pleased to hear from anyone who can offer to talk to the Club giving as much advance notice as possible—please contact: S. A. H. (Tony) Statham, Ashlyns Lodge, Chesham Road, Berkhamsted, Herts. HP4 2ST, UK. Tel. +44 (0)1442 876995 (or e-mail: boc.sec@bou.org.uk).

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Bulletin of the
BRITISH ORNITHOLOGISTS' CLUB

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CLUB ANNOUNCEMENTS

Committee welcomes the following new members who have recently joined the Club: Mr R. Caliman (Brazil) and Ms J. Portmann (Switzerland).

Members are reminded that subscriptions for 2008 were due on 1 January and are kindly asked to check that any standing orders with their banks are recorded at the correct amount (£20 p.a.). Regrettably, several members are still paying incorrect subscription rates which causes the Club unnecessary time and expense in administration duties.

ANNUAL GENERAL MEETING

The Annual General Meeting of the British Ornithologists' Club will be held in the Rector's Residence, Imperial College, 170 Queen's Gate, South Kensington, London SW7 at 6.00 pm on Tuesday 29 April 2008.

AGENDA

1. Minutes of the 2007 Annual General Meeting (see *Bull. Brit. Orn. Cl.* 127: 86–88).
2. Chairman's report.
3. Trustees Annual Report and Accounts for 2007 (both to be distributed at the meeting).
4. The *Bulletin* Editor's report—G. M. Kirwan.
5. Publications report—Revd. T.W. Gladwin, Chairman JPC.
6. The election of Officers. The Committee proposes that:
   (i) Mr S. A. H. Statham be re-elected as *Hon. Secretary*.
   (ii) Mr D. J. Montier be re-elected as *Hon. Treasurer*.
   (iii) One appointment to committee to be made (*vice* Dr J. P. Hume) from the following nominations: M. J. Walton. No other changes to the committee are proposed, as all other members are eligible to serve at least one more year in office.
   Ex-officio members (in continuation): Revd. T. W. Gladwin (*Chairman Joint Publications Committee*), Prof. R. A. Cheke (*Hon. Publications Officer*), S. P. Dudley (*Hon. Website Manager*) and G. M. Kirwan (*Hon. Editor*).
7. Any other business, of which advance notice has been given.

The 946th meeting of the Club was held on Tuesday 25 September 2007, in the Sherfield Building Annexe, Imperial College, London. Twenty-nine members and 18 guests were present.

Members attending were: Cdr. M. B. CASEMENT RN (*Chairman*), D. N. S. ALLEN, Miss H. BAKER, Sir D. G. BANNERMAN, Mrs D. M. BRADLEY, D. R. CALDER, Dr M. J. CARSWELL, Dr N. J. COLLAR, Dr J. H. COOPER, Earl of CRANBROOK (*Speaker*), E. C. DICKINSON, J. B. FISHER, F. M. GAUNTLETT, A. GIBBS, Revd. T. W. GLADWIN, D. GRIFFIN, K. HERON, Dr C. F. MANN, D. J. MONTIER, Mrs A. M. MOORE, P. J. OLIVER, R. C. PRICE, Dr R. P. PRŶS-JONES, R. J. PRYTHERCH, P. J. SELLAR, S. A. H. STATHAM, C. W. R. STOREY, P. J. WILKINSON and M. W. WOODCOCK.

Guests attending were: Lady M. P. BANNERMAN, M. BRADLEY, Mrs J. CALDER, Mrs C. R. CASEMENT, Mrs B. H. FISHER, Sir A. C. GALSWORTHY, A. GATHORNE-HARDY, Mrs M. H. GAUNTLETT, Mrs J. GLADWIN, I. GORRINGE, Ms B. HAMMOND-GIBBS, Mrs M. MONTIER, Dr A. POLASZEK, J. SIMPSON, C. E. TAN, Mrs F. WESTON, Dr D. WHITELAW and Mrs B. J. WOODCOCK.

After dinner, under the title *Swiftlets: retrospect and prospects*, Lord Cranbrook recounted his 50-year involvement with the Collocaliini (Apodidae). The 27 currently recognised species range from the Mascerenes to the south-west Pacific, with biodiversity peaks in the Philippines, New Guinea, and Malaysia and western Indonesia. The Himalayan population of one species is migratory; others are resident, though individuals do disperse long distances. Their taxonomy is complicated by high levels of morphological similarity. In Sarawak, in 1956, in the inland caves four nest types were known but only three species had been distinguished. Evidence that the type of nest was taxonomically significant resolved nomenclatural confusion. In 1956, Novick in Sri Lan working with Indian Swiftlet *Collocalia unicolor* and Medway in Sarawak with the Black-nest Swiftlet *Aerodram maximus*, independently showed that they orientate in darkness by echolocation. Based on subseque demonstrations of specific variation in the capacity to echolocate, in 1972 Brooke proposed the present gene classification, separating *Collocalia*, *Aerodramus* and *Hydrochous*. It is now known that, uniquely in the genu *Collocalia troglodytes* also echolocates. Sonographic analyses show that all echolocating calls consist of short burs of mixed frequencies concentrated around 2–5 kHz. Trials show that the echolocating call is useful only for da orientation and swiftlets depend on vision to hunt.

Breeding studies in Sarawak (around 03°N) reveal three annual peaks in laying by Black-nest Swiftlets, wi June–August witnessing minimal activity. A parallel study of White-nest Swiftlet *Aerodramus* (*f.*) *vestitus* show that laying commenced in September, with three distinct annual peaks and a quiescent period in June–mid Augu Swiftlets lay one or two eggs. Incubation period and subsequent nestling life are long and variable: Black-ne Swiftlet, nest life (as egg and nestling) *c.*87 days, White-nest 70 days, Edible-nest Swiftlet *Aerodramus fuciphag germani* 69 days and White-bellied Swiftlet *Collaocalia esculenta* 64 days. Slowed metabolic rate would account the long duration and variability of these life stages.

The nest cement of swiftlets (the edible component) is produced by paired salivary glands, which becom engorged when active and degenerate at other times. In Sarawak, a single annual moult begins in the primary tr in November and continues progressively through the year. Peaks of feather replacement and breeding alterna emphasising the narrow balance of resources and metabolic demands in the humid equatorial environme Studies reveal that swiftlets feed selectively with variation in prey reflecting the available resource. All can understood as selective adaptations to the safe nesting site provided by the darkness of caves. But, due to hum exploitation, no cave is now 'safe'. Despite many regulations for the exploitation of natural colonies of edible-ne species across south-east Asia, over-exploitation is rife. Theft is a severe problem for cave owners or managers. new phenomenon is the emergence of 'house-farming'. Although for more than a century swiftlets ha spontaneously used man-made structures, recent developments have been spectacular. Initially, operators in Ja used Linchi Swiftlets *Collocalai linchi* to foster *Aerodramus fuciphagus* eggs and young. This led to the transportati of eggs to places beyond the natural range of this taxon. In the past two decades, there has been a revolution in t behaviour of the swiftlets themselves. So many have now been reared in houses that they seek houses as nest sit Birds'-nest capitalists build vast swiftlet 'condos', where the constant repetition of recordings of the birds' ca attracts new colonists. This phenomenon merits scientific input to understand the biological background and assist in the safe and sustainable management of the living resource, the swiftlets themselves.

The 947th meeting of the Club was held on Tuesday 6 November 2007, in the Rector's Residence, 170 Queen's Ga Imperial College, London. Twenty-three members and 12 guests were present.

Members attending were: Cdr. M. B. CASEMENT RN (*Chairman*), Miss H. BAKER, K. F. BETTON, Mrs D. BRADLEY, D. R. CALDER, Dr J. H. COOPER, Dr C. T. FISHER, D. J. FISHER (*Speaker*), F. M. GAUNTLETT, GIBBS, D. GRIFFIN, Dr J. P. HUME, R. R. LANGLEY, D. J. MONTIER, Mrs M. N. MULLER, R. C. PRICE, Dr R. PRŶS-JONES, R. J. PRYTHERCH, P. J. SELLAR, S. A. H. STATHAM, C. W. R. STOREY, M. J. WALTON and P. WILKINSON.

Guests attending were: Mrs G. BISHOP, D. BRADLEY, M. BRADLEY, Mrs J. CALDER, Mrs C. CASEMENT, Mrs M. H. GAUNTLETT, Ms B. HAMMOND-GIBBS, Mrs M. MONTIER, C. A. MULLER, N. PEAC E. PRICE and W. PRICE.

After dinner, David Fisher gave a talk on the *Birds of Australia* and how its avifauna relates to that of the re of the world. David reviewed the families of birds that occur in Australia by showing photographs he had take of one species from each family, and explained how many species in each of these families occur in Australi Following this, he explained the various theories that had been put forward to explain the evolution of t Australian avifauna, including the most recent and most convincing, which is that the bulk of Australia's avifau evolved there from the families that had inhabited Gondwana prior to the break up of the ancient continent. Davi went on to explain and illustrate that this is why the closest living relatives of many distinctive Australian bir such Emu *Dromaius novaehollandiae*, Magpie Goose *Anseranas semipalmata*, Plains-wanderer *Pedionomus torquatu* megapodes (Megapodiidae) and frogmouths (Podargidae), are found in South America.

Rediscovery of Beck's Petrel *Pseudobulweria becki*, and other observations of tubenoses from the Bismarck archipelago, Papua New Guinea

Hadoram Shirihai

Received 31 December 2007

Beck's Petrel *Pseudobulweria becki* is considered 'maybe extinct' (Bretagnolle *et al*. 1998), 'exceedingly rare' (Brooke 2004), and is treated by BirdLife International (2004) as tically Endangered. It is known solely from two specimens collected in 1928 and 1929, d several recent unconfirmed sight records, the validity of which were questioned by ley & Scofield (2007). Here I announce the species' unequivocal rediscovery, including a ite substantial breeding population (indicated by recently fledged juveniles). I also sal-ged a freshly dead fledgling at sea. I discuss first the background to the field work, then identification and behaviour of *becki*, and finally I present other interesting tubenose ords made during my research.

Background and Methods

Field identification of tubenoses presents a great challenge in many parts of the world, t is the subject of a forthcoming monograph of the group (Shirihai & Bretagnolle in prep.). rticularly in recent years, I have commenced detailed research into the tropical-water ecies, especially those in the Pacific. My first visit to the Bismarck archipelago, in y–August 2003, was to search, successfully, for Heinroth's Shearwater *Puffinus heinrothi* irihai 2004). I also observed two other interesting petrels, Beck's and Fiji Petrel *P. cgillivrayi*-like birds, which inspired me to return to the area. (For details of the 2003 sur-y, see Shirihai 2004.) Thus, on 27 July–8 August 2007 I chartered the 24-m *FeBrina* to cover seas between New Britain, New Ireland and Bougainville, and some small island groups ther north (see Fig. 1). During the *c*.1,400-km voyage, with constant observation en route ween 'hotspots', 'chumming' was performed for 67 hours, using four tons of grated fish nains mixed with very dense fish oil and frozen in 20-kg blocks. These were prepared by ocal fish factory and were kept on board in a special freezer. By using frozen blocks, the al floats longer, permitting petrels to take the food before it sinks. Especially *Pterodroma* d *Pseudobulweria* petrels are more easily attracted to floating material of a certain size (per-tting more prolonged and closer views). I chose areas to 'chum' based on underwater ography (along contour lines and over seamounts), or close to islands with high moun-ns cloaked in forest, with constant cloud cover at their summits, where such petrels might ed. The petrels largely appeared to avoid the *FeBrina* and thus, when sea conditions were ourable, I used a 5-m skiff to permit closer observations and photography.

Following the 2007 voyage, I visited the American Museum of Natural History MNH), New York, to examine the two specimens collected by Rollo Beck and to prepare nparative morphometric data. Tissue samples from the fledgling I salvaged have been lysed by Bretagnolle *et al*. (in prep.), wherein the evolution and taxonomy of the genus *udobulweria* will be discussed.

I also documented my observations of Beck's Petrel in 2007 photographically, taking ages of 30+ individuals at sea, using a Canon DS1 camera with ImageStabiliser 300 and mm lenses.

Survey area

The Bismarck archipelago, north-east of Papua New Guinea, represents the above-surface portion of a complex oceanic ridge that runs north-west to south-east, and is almost semi-circular, partially enclosing the Bismarck Sea, and extending south to the Solomons. Most islands are mountainous, covered by tropical forest (replaced locally by plantations), and surrounded by extensive reefs that harbour the world's highest underwater wildlife diversity. Nevertheless, as Hadden (1981), Coates (1985) and Beehler *et al.* (1986) have noted, observations on seabirds in this region have been predictably few.

Beck's Petrel and its rediscovery

The two specimens in AMNH are: a female, taken at 03°S 155°E, east of New Ireland and north of Buka, Papua New Guinea, on 6 January 1928 by Rollo Beck, the principal collector of the Whitney South Sea Expedition; the second, a male, was taken east of Rendova, Solomon Islands, on 18 May 1929, also by Beck. The species was described, in *Pterodroma*, by Murphy (1928), who in comparing it to *P. rostrata* specified that 'The size distinction being greater than any yet recognized as subspecific among petrels, I have assigned specific rank

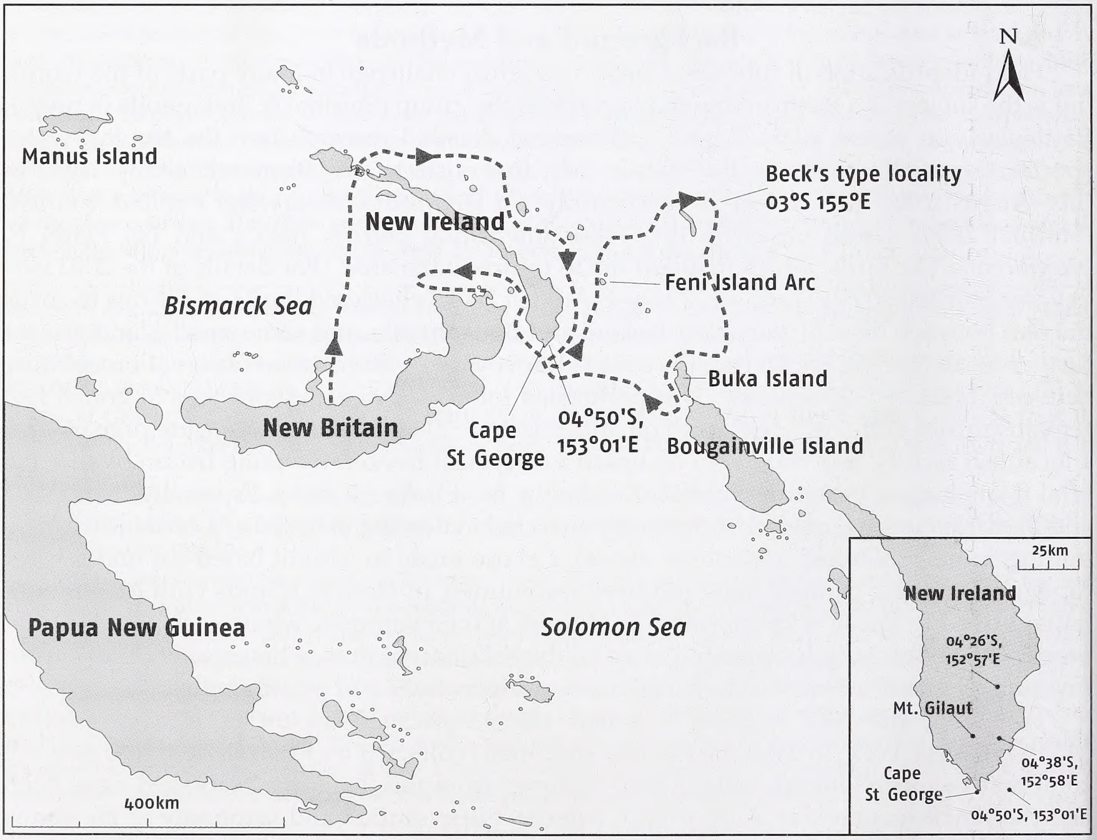
N
Manus Island
New Ireland
Beck's type locality
03°S 155°E
Feni Island Arc
Bismarck Sea
Buka Island
New Britain
Cape
St George
04°50'S,
153°01'E
Bougainville Island
Papua New Guinea
Solomon Sea
400km
25km
New Ireland
04°26'S,
152°57'E
Mt. Gilaut
04°38'S,
152°58'E
Cape
St George
04°50'S, 153°01'E

Figure 1. Map of the route followed by the *FeBrina* in July–August 2007. Departed Kimbe Bay, New Britain, on the night of 26/27 July, then partially circumnavigated New Ireland from the north-east, visiting islands to the north, including the Feni group, and the type locality, eventually reaching the northern end of Bougainville, before cruising north through St George's Channel, and off Cape Lambert; and docking at Rabaul, New Britain on 8 August. Note the Beck's Petrel 'hotspot' off Cape St George, and the montane forest ridges in southern New Ireland where Beck's Petrel might breed (bottom right).

to the new form.' He named it for Beck thus: 'It seems appropriate that the name of Rollo H. Beck, who has collected more Tubinares than any other man, should be commemorated within the group, and the receipt of this very interesting undescribed petrel gives an opportunity to pay him a well-deserved tribute.' Beck was also the first ornithologist to use 'chum' to attract tubenoses (Mearns & Mearns 1998), which method proved the key to rediscovering 'his' petrel.

Despite having positively identified Beck's Petrels in the Bismarcks in August 2003 (Shirihai 2004: see Appendix), I consider the 2007 voyage to mark the certain rediscovery of the species, due to the salvaging of a third specimen. Based only on sightings it would never be possible to prove the species' continued existence, because Beck's is fundamentally identical to Tahiti Petrel *P. rostrata*, except in size. However, in 2007, it was possible for the first time to observe Beck's and Tahiti Petrels side by side, and to establish some identification criteria for the former, as well as its abundance and behaviour. Close views revealed that many birds were post-breeding (moulting) adults or recently fledged juveniles. I also pinpointed a suspected breeding locality for Beck's Petrel based on the birds' behaviour.

My observations of Beck's Petrels in July–August 2007 were as follows (along with those Tahiti Petrels seen on the same days). *30 July*—Cape St George, southern New Ireland, at 04°50′S, 153°01′E. Two long 'chumming' sessions, in the morning and afternoon. Overall rather calm, but slightly stronger wind from mid morning to late afternoon. Totals of 20+ *becki* (max. 8 at one point/time, most being recently fledged juveniles) and six *rostrata* (two worn/moulting adults; four fresh juveniles). *31 July*—Left Cape St George at 05.00 h, but a tropical storm forced a change of direction, towards the Feni Islands. Five *becki* around the same area as the previous day and seven at 04°46′S, 153°01′E (max. 5, most apparently very fresh juveniles), and two *rostrata* (appeared evenly feathered, i.e. probably fresh juveniles) in latter locality. *3 August*—Arrived at *c.*06°00′S, 154°22′E, west of Buka Island, at 06.00 h, and 'chummed' until 15.00 h, at three main localities with water depths of 1,000–2,000 m. Moderate sea conditions. Three *becki* (one adult; two fresh juveniles) and five *rostrata* (one adult; rest fresh juveniles). *4 August*—Reached southern tip of New Ireland, near Cape St George, at 04°50′S, 153°01′E, at 05.30 h; 'chummed' on and off all day. Rather windy. At least 30 *becki* (max 16; mostly fresh juveniles, but some very worn/moulting adults). One freshly dead bird that had recently fledged was collected, and is now held at The Natural History Museum (NHM), Tring (BMNH 2008.1.1). Just two *rostrata* (a worn/moulting adult and a fresh juvenile). *5 August*—'Chumming' all day at 04°50′S, 153°01′E. Very calm in the morning but strong wind in the afternoon: 20+ *becki* (max 11; mostly fresh juveniles, some very worn/moulting adults) and eight *rostrata* (max 3; two worn/moulting adults and six fresh juveniles). *6 August*—'Chumming', between Cape St George and the Feni Islands, at 04°37′S, 153°10′E, 06.00–08.00 h, but no birds attracted; then moved into St George's Channel to reach off Cape Lambert. Five lone *becki*, mostly in the channel. *7 August*—'Chumming' in two locations, 06.00–08.30 h and 12.00–16.00 h, roughly off Cape Lambert. Light wind in morning, but very calm from midday. Five *becki* (two very worn adults in moult and three juveniles) at 03°54′S, 151°29′E, and seven (two very worn adults in moult and five juveniles) at 03°51′S, 151°31′E. In the first location, one *rostrata* (very worn adult in moult) and in the other two *rostrata* (a very worn adult in moult and a fresh juvenile).

In sum, Beck's Petrels were observed on seven of the 13 days of the expedition, in at least four different, well-separated localities. Thus, the species appears quite widespread in the area, albeit with Cape St George being the most favoured location. Tahiti Petrel was also present at most of the same localities, but in smaller numbers, though this might partially be explained by its tendency to keep further from the boat and / or 'chum'. *P. rostrata* also tends to congregate less than Beck's, which appears to more freely form small groups, especially at food. However, in many instances the two were seen close together, sometimes side by side at the 'chum' or when attracted to floating objects. Nevertheless, they never appeared to truly mix, and in some instances they even appeared to avoid each other. At two localities I observed Tahiti Petrels alone: two off Kimbe Bay and one off the Feni Islands (03°30'S, 154°19'E) on 27 July. Only once were there more Tahiti (five) than Beck's Petrels (three) present, on 3 August, off Buck Island. That Beck's Petrel went unknown for so long was due to its virtually identical appearance to Tahiti Petrel, but my observations suggest not only that Beck's Petrel is rather frequent in a certain sea area, but that it outnumbers Tahiti Petrel in the same region, at least seasonally.

Abundance of Beck's and Tahiti Petrels in the Bismarcks

Hadden (1981), Coates (1985), Beehler *et al.* (1986) and Marchant & Higgins (1990) all suggest that Tahiti Petrel is the most frequent gadfly petrel in the region. Marchant & Higgins (1990) also state that *becki* is known only from the two specimens and 'recent sightings' (but without details). Coates (1985, 2001), who regards Beck's as a race of Tahiti Petrel, considers the latter 'uncommon' around Papua New Guinea, including the Bismarcks and Solomons, with records in most months. Coates (1985) also mentions that '*becki* occurs in the north-east, and *rostrata* presumably in the south and probably elsewhere', though again his basis is unclear. Also included therein is a photograph of a bird trapped in Port Moresby, in May 1970, which was certainly *rostrata* based on its long wings. Coates & Swainson (1978) state that Tahiti Petrels were especially common in late February/early March 1975, between Wewak and Wuvulu. Bourne & Dixon (1971) suggested that a flock of ten birds observed by D. M. Simpson off the Wuvulu Islands, north-east of New Guinea, on 12 April 1969, may have been this species, as they were far from the known range of any similar petrel. There are also 19th century and other recent reports of petrels from this area that could have been *becki* (W. R. P. Bourne, G. Dutson and M. Imber *in litt.* 2008), but none possesses any documentation. Finally, Brooke (2004) added 'groups of up to 250 seen near the Solomons and the Bismarck Archipelago were perhaps this species (BirdLife International 2000)'. However, the origin of the record of 250 birds is a trip report, by A. Richards and R. Rowland, who counted 250+ Tahiti Petrels, between Madang and Wasu, on 16 November 1992 (Richards & Rowland 1995). Nevertheless, it is impossible to determine to what degree these past records of 'Tahiti Petrels' might include Beck's Petrel, whilst the basis for presuming that some of the earlier records from north-east New Guinea were *becki* appears to be primarily that they were made close to the type locality, as characters for separating *becki* and *rostrata* at sea were unknown until now, and it seems to have gone unappreciated that they do overlap in range. Already, *c.*10 years ago, M. Imber (unpubl. ms.) suggested that *becki* might be found in the Bismarcks and Solomons, and speculated that some published records of *rostrata* might actually pertain to *becki*, but he also stated 'there is a need to examine one or more in the hand so that this can be determined'.

Given my 2007 findings, it remains impossible to be sure whether past records of Tahiti Petrel were actually Beck's Petrel, but the fact that I found *becki* more abundant locally than *rostrata*, and that their at-sea separation was unknown, it seems probable that some (perhaps even most) previous records of Tahiti Petrel involved Beck's.

There is no correlation between daily numbers of the two species but, at least off Cape St George, Beck's is distinctly more abundant and regular than Tahiti (80–90% of the total numbers observed), and at this locality my impression is that Tahiti Petrels are perhaps mostly transiting the area. Cape St George was also the site of my 2003 observation of Beck's (Shirihai 2004; see Appendix), and the same day I also recorded 20 Tahiti Petrels, but these were mostly further south and offshore.

It is interesting to speculate whether only Beck's Petrel breeds in this region and, if so, to understand the origin of those Tahiti Petrels seen in the area. If both species breed there, do they segregate, or breed in mixed colonies? My 2007 observations suggest that they have rather parallel moult and, thus, perhaps breeding cycles. However, this alone cannot serve as indication that both breed in the region, and this question is one that particularly demands further and more detailed investigation.

Where does Beck's Petrel breed?

Beck's Petrel is probably nocturnal at the nesting sites and thus difficult to find, especially given that numerous potential breeding sites on atolls and islands exist. Brooke (2004) described the distribution of Beck's as presumably seas around the Solomons and generally north-east of Papua New Guinea, whilst Bourne (1965) speculated that higher hills in the Solomons represent a possible nesting locality. I would also highlight the following possibilities. J. Diamond (*Auk* 99: 821), in his review of Hadden (1981), wrote that that on Bougainville, including Mt Balbi, local villagers know of a dark bird the size of a small duck that apparently lives in burrows and whose local name, 'kikariko', derives from its voice. However, M. Imber (*in litt.* 2008) suggests that the vocalisations and behaviour of these birds appear to better fit a small shearwater than a petrel.

During 2007 I visited the type locality, at 03°S 155°E, very close to the flattish coralline Nuguria Islands, but failed to find Beck's Petrel in the area and the islands appeared unsuitable for burrow-nesting petrels. North of New Ireland I also failed to find Beck's Petrel, except seven birds south of the Feni Islands. Of all the islands north of New Ireland, the main island in the Feni group is the only one with substantial montane forest. No petrels were seen visiting the island at dusk on 1 August and native people confirmed that they have never seen such birds there. Nevertheless, close to Cape St George, I found a concentration of Beck's Petrels particularly close to land, involving recently fledged juveniles and a few moulting adults. Especially the adults came very close inshore in the early morning and, particularly in late afternoon and evening, sometimes even to within 1.5 km. Together with the discovery in the same locality of the freshly dead fledgling (with still a few single remnant downy feathers on the crown and chest), it seems plausible that *becki* breeds in the nearby montane forests of southern New Ireland, e.g. around Mt Gilaut (*c.*2,400 m) at 04°37′S, 152°52′E, around the peaks further east at 04°38′S, 152°58′E, and north at *c.*04°26′S, 152°57′E, including the Hans Meyer Range (max. *c.*2,400 m).

Conservation

Like other tubenoses, Beck's Petrel is potentially threatened by introduced cats and rats at its breeding sites, although until these have been identified this possibility remains speculative. A more germane threat to any breeding petrels in this region, and to the land avifauna, is mass logging and clearance for oil-palm plantations, especially by foreign companies and particularly in New Britain (Buchanan *et al.* 2008). International and regional conservation bodies must act in order to protect forests in the Bismarcks and elsewhere in New Guinea.

Description

Beck's Petrel is essentially a miniature version of Tahiti Petrel. Here I describe its characters and compare them with those of Tahiti Petrel.

Size, proportions and flight.—Measurements of the freshly dead *becki* collected on 4 August 2007 are compared with the two *becki* collected in 1928–29 in Table 1 (see also Fig. 3).

TABLE 1
Measurements (mm) of Beck's Petrel *Pseudobulweria becki* (three, the NHM bird measured prior to specimen preparation, by HS), and Tahiti Petrel *P. rostrata* (nominate and *trouessarti*, after Villard *et al.* 2006).

	Pseudobulweria becki			*Pseudobulweria rostrata*			
	BMNH 2008.1.1	**AMNH 235376**	**AMNH 220826**	***Rostrata***		***trouessarti***	
		type, ♀	♂	Polynesia–Marquesas (skins) range; mean ± sd		New Caledonia (alive) range; mean ± sd	
	4 August 2007	6 January 1928	18 May 1929				
				♂♂ (*n*=15)	♀♀ (*n*=14)	♂♂ (*n*=31)	♀♀ (*n*=29)
Wing	R 251; L 250	R 244; L 243	R 240; L 242	278–307 297.0 ± 8.4	285–308 294.4 ± 6.0	274–318 302.4 ± 7.5	282–318 297.5 ± 8.6
Tail	100	98	99.3	114–130 119.8 ± 4.3	115–128 120.2 ± 4.1	114–133 122.5 ± 4.0	113–128 120.4 ± 4.5
Bill	29	25.3	27.2	33.7–38.2 36.2 ± 1.0	33.1–37.4 35.4 ± 1.2	35.2–39.9 37.4 ± 1.2	32. 25–39.6 35.4 ± 1.3
Bill depth (at base of nostril)	15	12	14.5				
Bill depth (at gonys)	13	11.6	11.5	13.2–15.4 14.6 ± 0.6	12.9–15.0 13.9 ± 0.5	12.7–16.5 15.4 ± 0.6	13.5–15.45 14.4 ± 0.49
Tarsus	39.5	36.5	38.2	43.3–50.2 47.9 ± 2.0	43.4–51.0 47.4 ± 2.1	47.2–52.95 50.2 ± 1.4	45.8–50.85 48.7 ± 1.17
Moult and wear	Very fresh, and evenly feathered juvenile	Evenly feathered remiges and coverts, and generally quite fresh or slightly worn, suggesting a few months old juvenile	Evenly feathered remiges and coverts, and generally quite worn and bleached, suggesting almost one year old juvenile				

Measurements of the three are clearly complementary, with no apparent overlap between them and published measurements of either race of *rostrata*. Moreover, the former is smaller by *c.*15% in wing and tail measurements, but even smaller (*c.*25%) in bill and tarsus lengths. During August 2007 I observed Beck's and Tahiti Petrels side by side and, in such situations, the former appears 10–20% smaller with a shorter wingspan. Proportionately, Beck's also appears narrower winged. I measured the wingspan of the fresh juvenile several times (by stretching the wings, but not to their absolute maximum), achieving a mean of 84 cm. I have never measured the wingspan of live or freshly dead Tahiti Petrels, but it is interesting to note that Harrison (1983) (and apparently all subsequent authors, e.g. Marchant & Higgins 1990, Doughty *et al.* 1999, Onley & Scofield 2007) gives a wingspan of 84 cm for Tahiti Petrel, which appears far too short. My impression is that Tahiti's wingspan is probably only slightly shorter than those of White-necked Petrel *Pterodroma cervicalis* and Wedge-tailed Shearwater *Puffinus pacificus*. M. Carter & P. Walbridge (*in litt.* 2008) estimate the wingspan of Tahiti Petrel as *c.*1 m (based on two specimens and birds photographed at sea off Australia). Beck's is usually visibly (often obviously) shorter winged than all the latter three species (in direct comparison), and the wingspan appears similar to those of Mottled *Pterodroma inexpectata* and Soft-plumaged Petrels *P. mollis*, or even Phoenix Petrel *P. alba*, or perhaps midway between Black-winged *P. nigripennis* and Tahiti Petrels.

Doughty *et al.* (1999) and Onley & Scofield (2007) described the bill of Beck's as being 'proportionately smaller' or 'less robust' than that of Tahiti, but the bill of Beck's is still relatively deep-based though distinctly shorter (see Table 1). Thus, in relation to overall size,

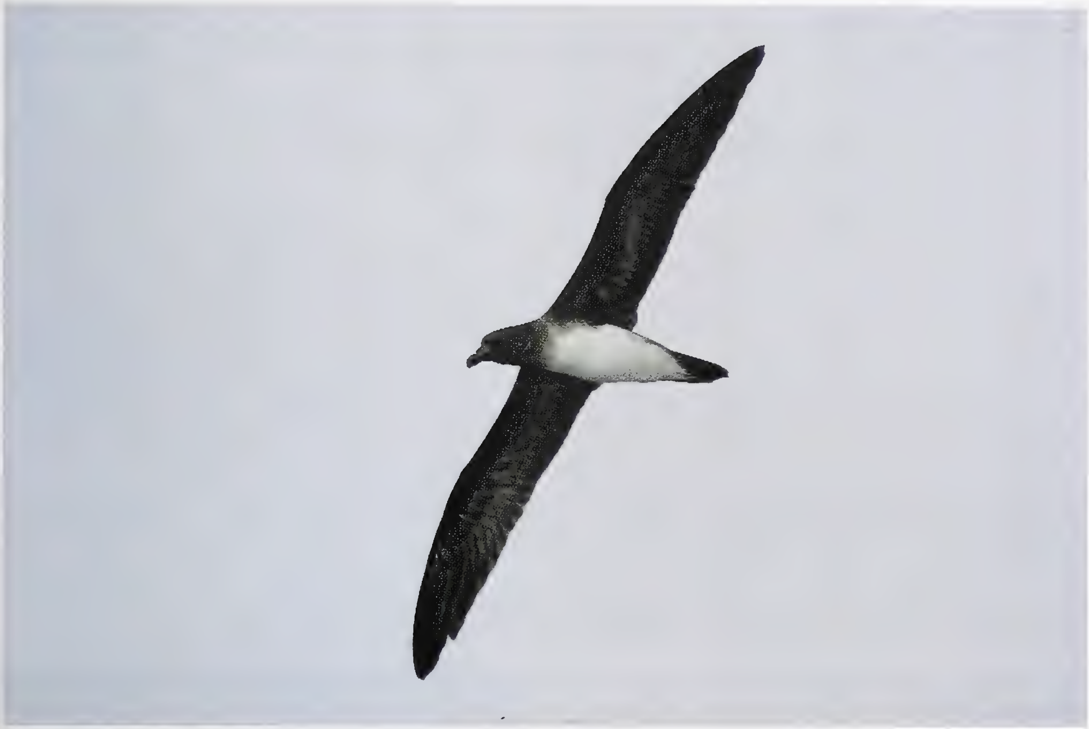

Figure 2a. Recently fledged juvenile Beck's Petrel *Pseudobulweria becki*, off Cape St George, New Ireland, Papua New Guinea, August 2007, showing the slighter and slimmer body than Tahiti Petrel *P. rostrata* (note the long/slender wings and elongated body); otherwise the two are virtually identical in shape and are identical in plumage. Note the evenly very fresh wing-feathers and mostly dark underwing-coverts (as in some populations of Tahiti Petrel *P. rostrata*, the underwing-coverts become whiter with age, forming a variable white band) (Hadoram Shirihai)

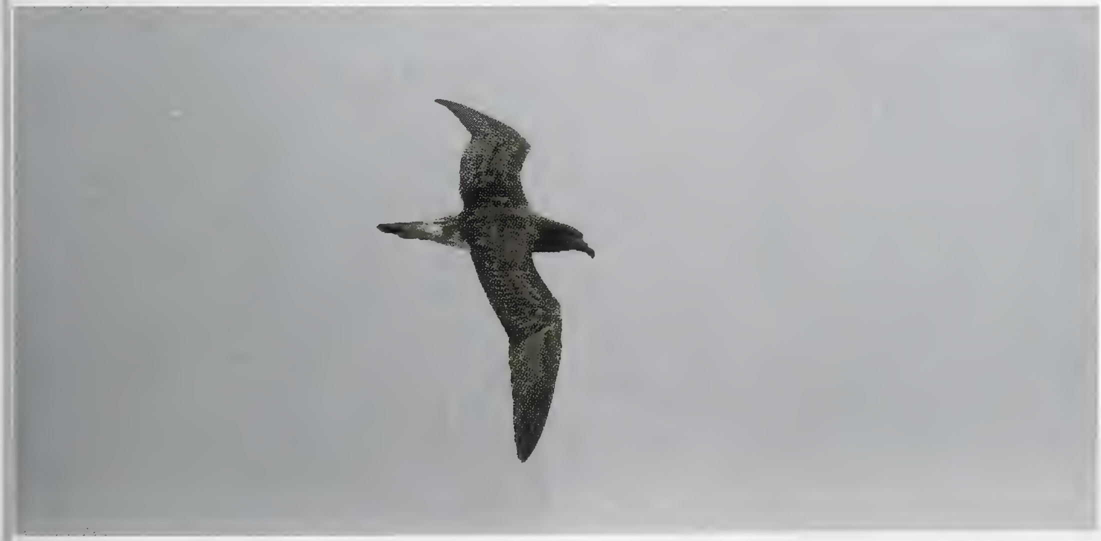

Figure 2b. Beck's Petrel *Pseudobulweria becki*, off Cape St George, New Ireland, Papua New Guinea, August 2007: note the paler uppertail-coverts, similar to Tahiti Petrel *P. rostrata*, which in both species vary individually and with wear and bleaching; apparently an adult or immature due to appearance of some moult limits and feather bleaching (Hadoram Shirihai)

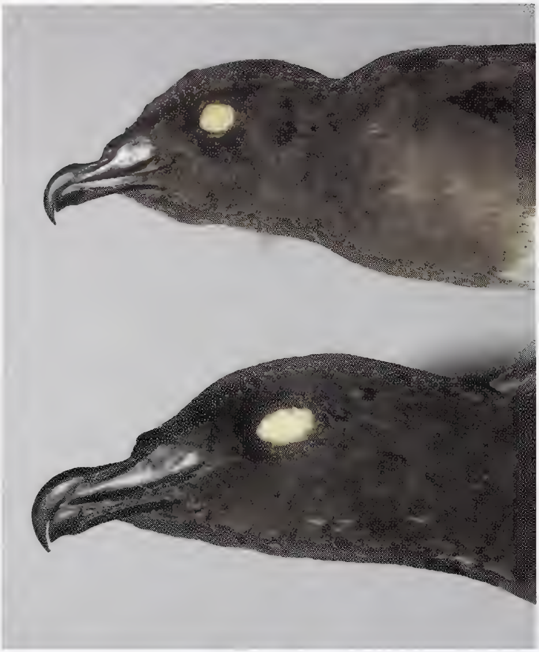

Figure 3. Comparison of the bill dimensions of Beck's *Pseudobulweria becki* (top) and Tahiti Petrels *P. rostrata*. Such distinctive differences in bill size support specific status for *becki*, but the field observer should bear in mind that these differences are not easily appreciated at sea. Specimens at AMNH, New York (Hadoram Shirihai)

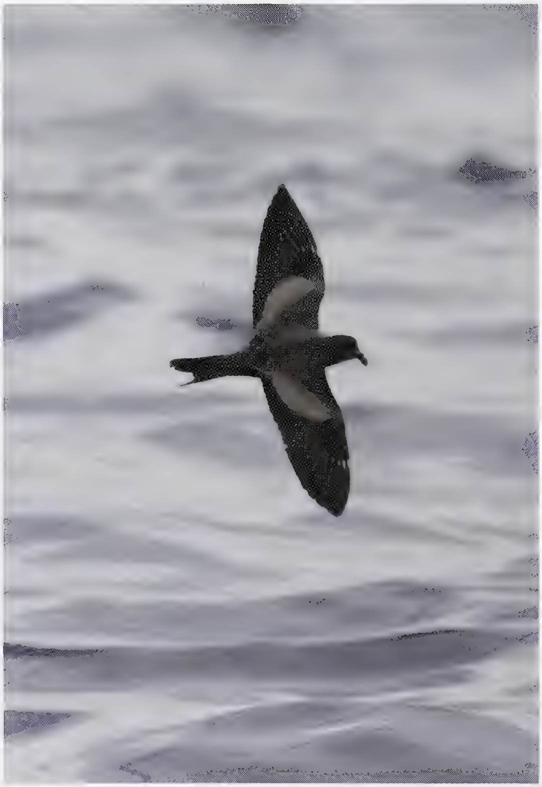

Figure 4a. Fresh juvenile Matsudaira's Storm Petrel *Oceanodroma matsudairae*, off Cape St George, New Ireland, Papua New Guinea. August 2007 (Hadoram Shirihai)

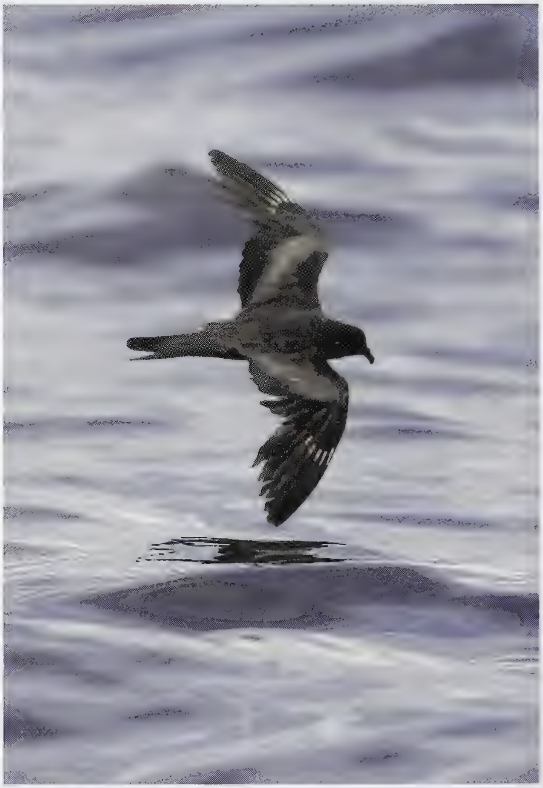

Figure 4b. Adult Matsudaira's Storm Petrel *Oceanodroma matsudairae* in extensive post-nuptial moult of the tail- and flight-feathers, off New Ireland, Papua New Guinea. August 2007 (Hadoram Shirihai)

Beck's appears to have a rather bulbous bill, which can seem confusingly 'massive' at sea (see Fig. 2).

Jizz and flight.—Beck's shares many structural characters, flight modes and behaviour with *rostrata*. Both possess an elongated body, long tapering tail, long neck but relatively small head, and bulbous bill. Both fly on long, narrow wings that, when gliding into the wind, tend to be held rather stiff and seemingly straight, but which in head-on or back views can be seen to be held in a shallow arc. Both have characteristic 'relaxed' wingbeats, but due to its shorter and narrower winged appearance, in Beck's the looser, languid and more elastic wingbeats appear more pronounced, sometimes even bringing to mind the display-flight of Ringed Plover *Charadrius hiaticula*. Beck's also appears plumper bodied than Tahiti. In some instances, Beck's has clearly more rapid wingbeats and shorter, more swooping glides, sometimes with more erratic changes of direction, whilst when arcing/banking these actions are often distinctly shorter and steeper, almost like a mid-sized *Pterodroma* petrel. In comparison, especially larger and heavier individuals of Tahiti Petrel are clearly stronger built, fly on longer and stiffer wings, with much gliding and long arcs, at greater speed, thereby affording an almost miniature albatross-like impression. Furthermore, both in 2003 and 2007, I observed Beck's in very calm conditions flapping their wings very rapidly, almost like *Cookilaria* petrels, or even a large storm petrel (or marsh tern flying close to the surface), especially around floating objects.

Even for an experienced seabird observer, it can require time, practice and, especially, direct comparisons to appreciate the structural and flight differences between Tahiti and Beck's Petrels. However, once these are learned, it can be rather straightforward to correctly identify many birds. Nevertheless, the following pitfalls demand mention. (1) Tahiti Petrel can appear misleadingly smaller and slighter, like Beck's, whilst geographical variation in size across the range of *rostrata* is poorly known due to the lack of specimens. It is important to note that populations of Tahiti Petrel do vary, even quite substantially, in size, with some populations being smaller and shorter winged (Bretagnolle & Shirihai in prep.). In consequence, sometimes the two species can be less appreciably different in size. Also, as in other petrels, bear in mind that individual and sexual size differences (Bretagnolle & Shirihai in prep.) could obscure differences between taxa (e.g. a larger male Beck's and smaller female Tahiti could differ less distinctly in size at sea). Fortunately, at least in the Bismarcks, the slightly larger race *trouessarti* of Tahiti can be more obvious to eliminate on size. (2) Also bear in mind the enormous effects of wind strength and direction on flight mode, as well as the bird's behaviour, e.g. if the bird is in direct flight or foraging, which all affect a bird's apparent size and shape. Thus, in certain circumstances, the flight of Beck's can appear slower and heavier, and the bird seem confusingly larger. On the other hand, a smaller Tahiti Petrel when feeding or flapping over a floating object can appear misleadingly smaller, and closer to Beck's.

Plumage.—A BirdLife International press release (www.birdlife.org/news/news/2006/06/becks_petrel.html) claimed that *becki* differs from *rostrata* in having a paler throat or whiter underwing-coverts (based on R. Baxter's claim; see Appendix). This is incorrect. Beck's and Tahiti Petrels are identical in plumage and both appear to vary similarly with age and wear (though see below). Both possess a uniform dark sooty-brown hood reaching to the breast and sharply demarcated from the white underparts, as well as, often, a variable paler brown transition on the lower breast (Fig. 2). The latter can appear more pronounced and frequent in Beck's, but there is much overlap. The upperparts, including wings, back and tail, are very dark brown to almost blackish brown, whilst the uppertail-coverts are variably paler. The vent, basal and central undertail-coverts are mostly white, but the outer coverts and their tips are always washed brown. Variable brown smudges on the body-sides and, especially, upper flanks, often merge broadly with the brown breast. The underwings of Beck's (as in some/most Tahiti populations) vary from uniform blackish brown to having a pale central area.

My observations of Beck's in the Bismarcks, and Tahiti Petrel there and elsewhere in the Pacific, suggest that both vary in similar ways with age and feather wear. The underwing-coverts of juvenile Beck's are initially mainly dark, without or with only a limited pale wash to the edges of the coverts on the central underwing, whilst adults develop broader and whiter feather centres which, due to wear and bleaching, form a large central belt across the underwing (subject to much individual variation). This also seems true of some/most populations of *rostrata*, but variation (both age-related and geographical) in the underwing-coverts of Tahiti is subject to ongoing study (Bretagnolle & Shirihai in prep.).

In both Beck's and Tahiti the paler uppertail-coverts are most obvious in worn plumage and appear most pronounced in adults/immatures (much less so in fresh juveniles). In August 2007 two main moult types were evident in both species: evenly fresh-feathered juveniles, and adults in different stages of feather wear and post-nuptial moult of body-, tail- and flight-feathers. This suggests that both species have rather parallel moult cycles, and thus feather wear and moult pattern cannot be used to distinguish them. Extremely worn adults, of both species, show some exposed white basal feathers on the upperwing and a pale central throat/breast area, as well as often-obvious moult limits and gaps in the wings.

Bare parts.—Both species have the bill and irides blackish, whilst at sea the feet and tarsi in close views may appear predominantly pinkish or dull flesh-coloured. The tarsi of the fresh juvenile Beck's were mostly bluish-pink with a dark brownish-black outer side; the feet and webs were mainly dark brownish black with a pinkish lower base and basal corner to the inner web (forming an oval patch). No Tahiti Petrels at the same stage have been examined for comparison.

Final remarks.—To positively identify Beck's Petrel, attempt to compare the bird/s in question with other petrels and shearwaters in the vicinity, preferably with Tahiti Petrel. With experience, it should be possible to reliably identify the distinctly smaller and lighter built Beck's from the larger Tahiti Petrel, especially in the Bismarcks. Suspected Beck's Petrels away from the core range will be extremely difficult to prove (see Appendix), unless directly and closely compared with Tahiti Petrel, and preferably well photographed. The occurrence of smaller Tahiti Petrels must also be kept in mind. Thus, only if obvious overall size differences and the shorter but relatively stubbier bill of Beck's are evident will certain identification be possible. Few medium-sized white-bellied gadfly petrels might be confused with Beck's (and Tahiti) Petrels, e.g. Phoenix Petrel, but these are readily distinguished, if seen well, by plumage characteristics and shape (e.g. Phoenix has a diagnostic whitish leading edge to the underwing).

Foraging behaviour and response to boat

Beck's Petrel differs from *rostrata* in several respects. Whilst both are generally rather shy of boats (i.e. usually avoiding or only briefly investigating them), and rarely follow boats for extended periods, unlike, e.g., Providence *Pterodroma solandri* and Murphy's Petrels *P. ultima*, Beck's Petrel to some degree is more tolerant of vessels. It was observed to approach the bows closer and, perhaps, more frequently than Tahiti whilst transiting the area, but still only briefly. When the *FeBrina* was stationary at 'chum' far greater numbers of Beck's came to investigate (four of ten birds) than Tahiti Petrels (1/10). In most instances Beck's still tended to keep at least 300 m distant from the boat, but Tahiti remained even further away and made briefer and more 'hesitant' approaches. In response to the skiff more obvious differences between the two were observed: Beck's was noticeably more attracted to the 'chum', sometimes coming just a few metres from the skiff, whereas Tahiti always maintained at least *c*.50 m from the boat. Beck's was observed to remain at the 'chum' for an average 1–2 minutes (sometimes five minutes), and often patrolled the slick several times, but Tahiti usually checked the 'chum' more briefly and directly (without the zigzagging flight of Beck's). Thus, at least in the Bismarcks and at this season, Beck's seems to better tolerate boats and to be more attracted to 'chum' than Tahiti. Both, however, have a similar feeding technique, collecting food from the surface in flight. It should be emphasised that these behavioural differences are related to a specific time and locality, and should not be used to support identification. It is probable that elsewhere and in other circumstances the two species will behave differently. For instance, off Southport, Queensland, Tahiti Petrels are highly attracted to shark liver (but not other 'chum'), when they sometimes approach to within 1 m of a large boat, even flying over the deck (M. Carter *in litt*. 2008).

Systematics and taxonomy

The present work has elucidated evidence that *becki* and *rostrata* differ considerably in size and behaviour at sea, and that *becki* appears to warrant specific status. Some authors (e.g. Brooke 2004, Onley & Scofield 2007) recently considered *becki* to be a separate species, but this was not based on analyses of DNA or biology. Bretagnolle *et al*. are currently examining the molecular characteristics of the two.

Fiji-like Petrel

Both in 2003 and 2007 I observed dark Fiji Petrel *Pseudobulweria macgillivrayi*-like birds in the Bismarcks, as follows: *2003*—One, on 14 August, off Kimbe Bay, New Britain, Papua New Guinea (Shirihai 2004). *2007*—One, on 31 July, between the southern end of New Ireland and the Feni Islands (*c*.04°20'S, 153°18'E), with a similar bird, also on 7 August, off Cape Lambert (at 03°51'S, 151°31'E), which investigated the 'chum' for two minutes at the same time as two Beck's Petrels.

All three birds had a similar structure to *Pseudobulweria* petrels, especially Beck's in shape, but two birds seemed to be slightly smaller overall, despite appearing to have a more robust body, larger head and heavier bill, more rounded wings, and shorter and squarer tail. At certain angles, overall jizz and flight silhouette approached those of *Bulweria* petrels. Their plumage was predominantly or uniformly dark chocolate-brown, with a slightly darker head or face, no, or only a fractionally paler, upper wingbar (in one, slightly paler secondary-coverts were seen, perhaps attributable to feather wear). The basal remiges and larger wing-coverts from below were tinged greyer (rather obvious in sunlight).

Mainly due to the lack of comparative photographic references or even a description of the species' appearance and behaviour at sea, I regard these records as uncertain for now, especially as these birds could even represent an undescribed *Pseudobulweria*. Another suspected Fiji Petrel was observed, on 12 April 2007, north of Bougainville, at *c*.01°50'S, 153°59'E (S. N. G. Howell pers. comm.; www.wildwings.co.uk), but no detailed description is presently available of this bird.

Fiji Petrel was discovered by Dr F. M. Rayner aboard the *Herald*, at Gau in October 1855, and was described by G. R. Gray, in honour of the expedition's other naturalist, John MacGillivray. The species went unrecorded until 1985, when Dick Watling captured an adult and a fledgling on Gau (Watling & Lewanavanua 1985). Since then, there have been several more records from the same island, mostly of birds attracted to lights at night (D.

Watling pers. comm.). Thus, other than my putative records from the Bismarcks, this petrel is known solely from Fiji. However, further research might easily prove these birds to be regular in the Bismarcks (given the extremely limited attention devoted to pelagic species in the archipelago to date), and I will be returning there in 2008 to try and relocate these birds.

Other possible new tubenoses for Papua New Guinea waters

Providence Petrel *Pterodroma solandri* One on 4 August 2003, *c.*17 km off Buka Island, Bougainville (Shirihai 2004), apparently is the first record for Papua New Guinea (Beehler *et al.* 1986, Coates 1985, 2001). Given that it breeds relatively close by, principally on Lord Howe Island, and is at least a partial transequatorial migrant (Brooke 2004), the species has probably been overlooked previously in the area and might well prove to be regular in the Bismarcks.

Christmas Shearwater *Puffinus nativitatis* One off the Feni Islands (at 03°45′S, 153°50′E), on 1 August 2007, is apparently the first record for Papua New Guinea (Beehler *et al.* 1986, Coates 1985, 2001). Given that the species breeds reasonably close by in the central Pacific, it is again unsurprising that it should occur in the Bismarcks.

Matsudaira's Storm Petrel *Oceanodroma matsudairae* During 13 days at sea in July–August 2007, the species was identified and photographed (Fig. 4) on seven days at well-separated localities, as follows. *28 July.*—Off New Ireland, at 02°23′S, 150°52′E, five adults in extensive moult, especially their primaries (most with gaps in the remiges and a few old outer primaries and broken tail-feathers). *29 July.*—Off New Ireland, at 02°17′S, 152°04′E, three adults in extensive moult (as above). *30 July.*—Near Cape St George, at 04°50′S, 153°01′E, a fresh juvenile. *1 August.*—Off the Nuguria Islands, one at 03°36′S, 153°58′E and another at 03°28′S, 154°27′E. *2 August.*—East of the Nugurias, four observed (some adults in moult). *3 August.*—West of Buka Island, north of Bougainville, in waters 1,000–2,000 m deep, 12, with max. 4 at one location, all adults in moult. *7 August.*—Off Cape Lambert, at *c.*03°51′S, 151°31′E, a fresh juvenile. Matsudaira's Storm Petrel is apparently unrecorded in Papua New Guinea's waters (Beehler *et al.* 1986, Coates 1985, 2001), although Bourne (1998) mentions a report of two large dark storm petrels, thought to be this species, seen between Manus and New Guinea, on 6 August 1997. With up to 12 birds at one locality, the species is apparently not rare here, albeit perhaps only seasonally. My observations might seem unsurprising, given the chronic lack of previous work on pelagic seabirds in this region. Nevertheless, in August 2003 I did not see any Matsudaira's Storm Petrels in the area, so the numbers in July–August 2007 might be exceptional. The migrations of *O. matsudairae* are not well known (Brooke 2004), especially its at-sea range during post-breeding and moulting dispersal, making my observations of especial interest. However, it does appear quite likely to be found on migration in August in the region, en route to its Indian Ocean winter quarters, having been recorded around Wallace's Line and south to north-west Australia (Bailey *et al.* 1968, Brooke 2004).

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Kerry Start (all BirdLife International), as well as Guy Dutson, Walter Boles, Tony Pym and Alison Harding helped with references and records of petrels from New Guinea. Guy Dutson also commented on the manuscript. Bill Bourne and Mike Imber provided many useful comments and ideas for improving the paper. Mike Carter kindly sent comments on identification and, together with P. Walbridge, provided notes about wingspan of Tahiti Petrel. Tony Palliser shared his observations from the Bismarcks and, as always, was very encouraging. Steve Howell and John Brodie-Good shared their observations from 'The Western Pacific Odyssey 2007'. Guy Kirwan made many constructive editorial comments and improvements. Finally, I would like to dedicate the rediscovery of *P. becki* to Bill Bourne, in recognition of his enormous contribution to our knowledge of the life histories and taxonomy of petrels, as well as his 'The Missing Petrels' paper, which urged continued hope for the feared 'lost' species. I, for one, will continue searching for the 'missing petrels'.

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Appendix: Other claimed records of Beck's Petrels.

1. Recent undocumented records of 'possible Beck's Petrel' from the Bismarcks

December 1987.—One, possibly this species, seen by T. Palliser (*in* Shirihai 2004), on 28 December 1987, c.2 nm off Cape St George, New Ireland. One of six Tahiti Petrels mentioned by Palliser (1987) in his unpublished trip report. Initially, on checking TP's field notes, I strongly suspected that this bird was a Beck's Petrel. However, it has never been claimed by the observer as a Beck's and T. Palliser (pers. comm.) requests that it should be regarded as

'Tahiti/Beck's' or possible 'Beck's'. It was not observed with another species to permit an accurate size comparison, thus the record should be treated as 'unconfirmed' or 'possible' Beck's Petrel.

August 2003.—Three Beck's Petrels, on 5 August 2003, 2–6 nm off Cape St George, New Ireland (Shirihai 2004), were observed in very good conditions, once even from just 100 m (a concise description can be found in Shirihai 2004). Initially, I identified them as Beck's Petrels, mainly based on their size and different flight behaviour, compared to the few Tahiti Petrels observed simultaneously. However, I published the record (Shirihai 2004) as 'possible Beck's' because I could not compare my observation with any others, leading me to be cautious. That these three were observed in the same place as some of my August 2007 observations strongly suggests that they were indeed *becki*, but I still prefer to regard the observations reported in this paper as constituting the official rediscovery of the species.

April 2007.—'A small, short-winged Tahiti-type off the west coast of Bougainville, Papua New Guinea, on 11 April was strongly suspected to be this species' (J. Brodie-Good & A. Roadhouse; www.wildwings.co.uk). JB-G wrote in the voyage diary: 'A few minutes later a more urgent shout "possible Beck's Petrel on the sea ahead!" From the bridge you could see [it] settled on the water ahead but [. . .] it was a long way away. [. . .] It got up and flew [. . .] away with a number of people getting very excited [. . .]. For me and many others it was simply just too far away to call such a major bird [. . .]. During the last hour of the day at least two Tahitis were seen and three Tahiti-types [which] did appear to be shorter winged and flying like shearwaters but with such little wind it was far from easy to be conclusive. [. . .] it seemed the bird just as we stopped was [. . .] the strongest claim but I feel some caution is required [. . .]. It was distant and when pressed for a written description the next morning a number of the observers concerned "backed down" somewhat. The relative size comparison with a noddy seemed to be the main crux but Brown Noddy and Tahiti Petrel have the same wingspan and Beck's is only supposed to be 15% shorter. At the distance and intense light, with almost no wind, it's a very subjective call, certainly far from enough to get a record past a rarities committee [. . .] (Steve Howell is still adamant about this bird).'. I find it useful to quote these words as they precisely illustrate the challenge that even highly experienced observers can encounter when trying to separate Beck's and Tahiti. Nevertheless, in May 2007, S. Howell (pers. comm.) provided me with a brief verbal impression of the bird, which appeared noticeably small and slight, and sounded convincing for Beck's (the locality is also close to where I found Beck's frequently in August 2007).

2. Recent claimed record outside the Bismarcks

R. Baxter submitted a description and photograph to the 'Birds Australia Rarities Committee' of a bird believed to be a Beck's Petrel in Australia's Coral Sea, off Queensland, on 7 November 2005 (http://users.bigpond.net.au/palliser/barc/SUMM489.htm). However the record was not accepted as the committee felt that it was impossible to truly ascertain size and structure from the photograph. It *is* very difficult, and often impossible, to gain a true impression of size and structure from a single photograph, especially if the bird is distant and the photograph is not the best quality. Furthermore, two issues support non-acceptance, namely that RB was unable to directly compare his bird with *rostrata*, and that he rather strongly based his identification on the pale throat. It is now clear that this character is invalid (see Plumage). Given that I have found, in both the western and central Pacific, smaller Tahiti Petrels, and that variation within the latter is subject to ongoing research (Bretagnolle & Shirihai in prep.), much caution is required to claim Beck's outside its core range.

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Editor's note.—Like Whitney's (*Bull. Brit. Orn. Cl.* 125: 108–113) first field observations of the almost unknown in life and globally threatened Rondônia Bushbird *Clytoctantes atrogularis*, Shirihai's unequivocal rediscovery of the arguably even poorer known *Pseudobulweria becki* has been fast-tracked for publication, in the belief that swift communication and dissemmination of such findings are particularly important for the conservation of 'lost' birds. *Bull. Brit. Orn. Cl.* will continue to prioritise publication of such rediscoveries in the future, subject to the usual constraints of the refereeing process.

The bird collections of Cuba

by James W. Wiley, Rafaela Aguilera Román, Alfredo Rams Beceña, Carlos Peña Rodríguez, Arturo Kirkconnell, Antonio Ortega Piferrer & Martín Acosta Cruz

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Although substantial collections of birds have been made from the many islands of the Caribbean, most specimens were acquired by visiting ornithologists or their collectors and now reside in foreign institutions. Further, many ornithologists who resided in the islands transferred their collections abroad; e.g. while at the College of Agriculture and Mechanical Arts at Mayagüez, Puerto Rico (1926–38), Stuart T. Danforth (1900–38) collected extensively in Puerto Rico and other West Indies. He amassed *c.*3,000 specimens, but only six remain in Puerto Rico, whereas the bulk went to the US National Museum of Natural History (USNMNH). Similarly, William T. March (*c.*1796–1872), a resident of Jamaica, contributed more than 1,100 specimens to the USNMNH alone; today, none remains in Jamaica. Raffaele Ciferri (1897–1964), who resided for many years in the Dominican Republic, sent 345 specimens to the Museo Civico di Storia Naturale in Milan, leaving none in country. Although a few collections were established in the islands, unfortunately several were lost to catastrophes, including the Haitian material of Michel Etienne Descourtilz (1775–1836) and Félix Louis l'Herminier's (1779–1833) Guadeloupe collection, both lost in fires.

Cuba was unusual in that several collections were established and maintained there. Felipe Poey y Aloy (1799–1891), the Cuban naturalist who established the first museum of natural history in Cuba (1839), stated that 'a modern city can not be considered culturally developed if it lacks a natural history museum.' He and other resident naturalists gathered specimens that were retained in Cuba, rather than sending them to institutions abroad. Notable amongst those naturalists was Juan (Johannes) Gundlach (1810–96), who spent 57 years collecting in Cuba. Despite incentives to disperse his material amongst foreign institutions, Gundlach's aspiration was to maintain his substantial collections in Cuba. He lived to see that wish fulfilled; in 1892, Spanish authorities authorised by Royal Decree in Madrid the payment of $8,000 Pesos gold for the Gundlach collections, which contain many types, co-types and unique specimens. His birds, molluscs, insects and mammals were established in the museum of the Instituto de Segunda Enseñanza de La Habana. Though they moved among several institutions, the Gundlach material has been maintained largely intact in Cuba through the present, most recently in the Instituto de Ecología y Sistemática. Several other institutional and private collections of birds were developed, primarily from the late 19th to mid-20th centuries; e.g., Gaston S. Villalba (fl. 1930s), Stephen C. Bruner (1891–1953), Joaquín Fernando de la Vara (1893–1981) and José H. Bauzá (fl. 1920s to mid-1960s).

In addition to substantial historic collections, several new collections have been established. Most recently, Orlando H. Garrido (b. 1931) has added substantial numbers of bird specimens, primarily to the Museo Nacional de Historia Natural de Cuba. Subsequent to the Cuban Revolution (1959), specimens from some historic collections were distributed among newly developed institutions (e.g., Museo de Historia Natural 'Tranquilino Sandalio de Noda' in Pinar del Río). At other post-Revolution museums (e.g., Museo Provencial 'Arcadio Leyte Vidal Delgado' in Mayarí), representative specimens of Cuban birds were collected. Many of these collections, recent and old, have been maintained in several institutions and privately within Cuba.

We examined extant collections throughout Cuba and Isla de Pinos (now Isla de la Juventud), with the objective of developing an electronic catalogue of specimens as the initial step in improving communication and resource-sharing among Cuban collection managers and to facilitate international exchange. Here we report on the nature of these collections, their holdings, condition and importance to our understanding of Cuba's biodiversity.

Methods

From 1995 through 2006, Wiley visited 18 collections in Cuba (Table 1). Through the text, we abbreviate the names of institutions and individual collections. Full titles of institutions and collections owned by individuals are presented in Table 1. Working with local curators, Wiley examined catalogues and other written records for specimens in those collections. Data were entered into standardised database files (Claris FileMaker Pro) for each collection. Further data available on specimen labels were added to the database. Specimens in most collections were examined to confirm existence and to assess their condition.

Some catalogue entries for eggs include multiple clutches (e.g., 32 eggs under one catalogue number). Where possible, such combinations were identified as multiple clutches. Otherwise, the catalogue sets were not divided into individual clutches in the summary, but were maintained as one data entry.

Many collections included foreign specimens obtained by local curators or private collectors through purchase or exchange. We present data for all specimens (including foreign-obtained individuals) in our analysis of total collection holdings. In our analysis of Cuban specimens, we have excluded foreign specimens, as well as individuals for which no locality data were available, and for which the origin could have been other than Cuba; e.g., Greater Antillean Grackle *Quiscalus niger*, a West Indian endemic, but occurring outside Cuba. Where locality data were not found but evidence was available to determine that the specimen was collected in Cuba, we assigned the specimen to that country; e.g., date and collector information gave verification of origin, although no locality data were available in the catalogue or specimen label. Those specimens for which no evidence of origin was determined were excluded from our tabulations.

Condition was assessed for all examined specimens and individuals were assigned to one of three categories: Good—no or minor deterioration, specimen intact, with good plumage, and with no more than light mould or slightly soiled; Fair—specimen with some problems, but retaining all parts, though some (e.g., tail or wing) may be partially detached from body, and plumage may have moderate mould or dirt; Poor—specimen missing body parts (e.g., leg, head), is heavily soiled, or has substantial mould.

Nomenclature follows the American Ornithologists' Union *Check-list* (1998) and subsequent supplements (Banks *et al.* 2000–06) or, where the *Check-list* did not cover the species, we referred to Howard & Moore (1991). We followed BirdLife International (2000) for species status, but also relied on González Alonso (2002) for a local appraisal. All categories of threat follow the criteria of BirdLife International (2000).

Because of space limitations, several tables describing specimens in the Cuban collections are not included here, but are available from the corresponding author.

Results

After completing acquisition and cleaning of data, they were transferred into two additional software realms: MS Excel (spreadsheet) and MS Access (database) for greater flexibility in use by local curators. These files were provided to all collection curators and are available for other interested workers in Cuba.

TABLE 1
Names of 18 examined Cuban collections, with their locations, abbreviations, and curators.

Name of collection	**Location**	**Abbreviation**	**Curator**
José H. Bauzá Collection	Museo Nacional de Historia Natural de Cuba, La Habana	Bauzá	Arturo Kirkconnell
Museo Tomás Romay	Santiago de Cuba	BioEco	Omar Melián
Museo Provencial Ignacio Agramonte	Camagüey	Camagüey	Leonardo Pareta
Carlos Wotzkow Private Collection	In home, La Habana	Wotzkow	Carlos Wotzkow (in exile)
Museo de Historia Natural 'Felipe Poey'	Universidad de La Habana, La Habana	Felipe Poey	Martín Acosta Cruz
Museo de Historia Natural 'Joaquín Fernández de la Vera'	Gibara	Gibara	Antonio Ortega Piferrer
Museo de Historia Natural 'Carlos de la Torre y Huerta'	Holguín	Holguín	Alfredo Rams Beceña
Instituto de Ecología y Sistemática	La Habana	IES	Rafaela Aguilera Román
Instituto de Segunda Enseñanza 'Cuqui Bosch'	Santiago de Cuba	Instituto Segunda Enseñanza	Ana Nydia Alvárez
Museo de Historia Natural 'Dr. Antonio Nuñez Jiménez'	Nueva Gerona, Isla de Pinos	Isla de Pinos	Lissett Macia
Museo Provencial 'Arcadio Leyte Vidal Delgado'	Mayarí	Mayarí	Teresa García Guerrero
Museo Nacional de Historia Natural de Cuba	La Habana	MNHNC	Arturo Kirkconnell
Colección Didáctica – Pedro Regalado – INDAF	Camagüey	Regalado	Pedro Regalado
Museo de Historia Natural 'Tranquilino Sandalio de Noda'	Pinar del Río	Pinar del Río	Alexis Plasencia
Museo de Historia Natural 'Charles T. Ramsden'	Santiago de Cuba	Ramsden	Gerardo Hechevarría
Museo de Historia Natural de Sancti Spíritus	Sancti Spíritus	Sancti Spíritus	José M. Ramos Hernández
Museo General de Caimito[1]	Caimito, La Habana	Caimito	William Suárez
Museo 'Oscar María de Rojas'	Cárdenas	Cárdenas	Lazaro Miranda

[1] In 2007, we learned that this collection was destroyed by Hurricane Dennis (2005).

Of the specimens determined from available records, including catalogues and specimen labels (*N*=12,600), we were able to examine (counting specimens verified by the Camagüey curator) 11,055 individuals, including foreign-obtained specimens (Table 2). Although we were not permitted to examine specimens in the Camagüey collection, the curator provided an assessment of specimen condition and status of 349 (202 Cuban specimens) of the 579 specimens, though he could not provide information on the means of preservation (mounts or study skins) for individuals.

TABLE 2
Numbers of bird specimens catalogued and examined in 18 Cuban collections, divided by preservation method and type of preserved material. Analysis includes foreign and Cuban-collected specimens.

	Number (%)			
	Class of Cuban and foreign specimens		Cuban specimens	
Specimen type	All specimens[1]	Examined[2]	All specimens[1]	Examined[2]
Undetermined[3]	1,402	349 (3.2)	1,006	201 (1.9)
Study skins	6,138	5,931 (53.6)	6,008	5,795 (55.6)
Mounts	3,954	3,695 (33.4)	3,540	3,350 (32.2)
Eggs	1,032	1,006 (9.1)	1,019	1,000 (9.6)
Nests	44	44 (0.4)	41	40 (0.4)
Skeleton	3	3 (<0.1)	3	3 (<0.1)
Alcoholics	2	2 (<0.1)	2	2 (<0.1)
Fossils	25	25 (0.2)	25	25 (0.2)
Totals	12,600	11,055 (100)	11,644	10,416 (100.0)

[1] Includes specimens examined, as well as those listed in recent catalogues but not located or discarded before we completed our survey.

[2] Excludes specimens listed in recent catalogues but not found, or examined in our early visits to collections but discarded before completion of the survey.

[3] Undetermined category includes specimens listed in recent collection catalogues and not found by us, as well as specimens in the Camagüey museum, where we unable to examine the birds (see main text).

The collections of all specimens, Cuban and foreign, contain representatives of 25 orders and 80 families, and a total 485 species. Among those specimens collected in Cuba, 21 orders, 63 families and 352 species are represented. A total of 10,416 extant specimens collected in Cuba was tallied (Table 2), including 19 holotypes and 30 paratypes. The majority (57.5%) of specimens was collected in the latter half of the 20th century, whereas 36.5% were collected in the first half, and 6% in 1850–99 (96% of these by Gundlach) (Fig. 1). Few specimens have been collected since the 20th century, in part due to economic constraints that limit field work by local scientists, but also because of a shift in interest to other aspects of ornithology, especially ecological studies.

The largest collection is in the Instituto de Ecología y Sistemática in La Habana (31.0% of all specimens), which houses the original Gundlach 'Historic' collection (565 specimens) and 'Basic' (more-recently acquired) collection. The other major collections are the Museo de Historia Natural 'Felipe Poey' of the Universidad de La Habana (23.4%), Museo Nacional de Historia Natural de Cuba in La Habana (11.3%) and Museo de Historia Natural 'Charles T. Ramsden' (Santiago de Cuba; 9.4%). Specimens are preserved primarily as study skins (56.6%) and mounts (33.3%), though substantial numbers of egg sets are also held in the Ramsden and Instituto de Ecología y Sistemática collections. Several collections, meant primarily for public display, consist solely of mounted specimens (e.g., Bauzá and Isla de Pinos).

Several collections contain substantial numbers of foreign specimens (Σ=4.8%, overall), obtained through trades and donations, including Holguín (19.5%), Pinar del Río (37.2%) and Camagüey (42.4%). As additional public museums were created in Cuba after the Revolution, many of the foreign specimens in pre-established collections were distributed to the new institutions for display. Most recent collections have concentrated on acquiring native species.

All species of special concern with Cuban ranges (residents and visitors) are represented in the island's collections, including two species (Passenger Pigeon *Ectopistes migratorius*, Cuban Macaw *Ara tricolor*) that have become extinct recently (Table 3). Among species represented, four are considered Critically Endangered (Adams *et al*. 2003, González Alonso 2002), 12 are Endangered and 23 are Vulnerable (Table 3).

Our evaluation of specimen condition yielded an overall 83.4% of specimens in Good condition, whereas 10.0% were judged in Fair and 6.8% in Poor condition. Unfortunately, a substantial number of specimens in most collections lack critical data, with a mean 22.4% of specimens lacking locality data, 30.4% missing collection dates, and 22.5% lacking name of the collector.

Discussion

Natural history museums, including their research collections, have been characterised as functional biological libraries, but without easy access for researchers, they only serve as storehouses for specimens (Winker 1996, Peterson *et al*. 2005). Several workers have emphasised the importance of user-friendly access to collections (Reaka-Kudla *et al*. 1997, Krishtalka & Humphrey 2000). Scientific museums are starting to be considered an important tool for cataloguing biodiversity (Beolchini 2002), so their role in providing easy access to specimen data has greatly increased (Alberch 1993, Cooper & Steinheimer 2003, Peterson *et al*. 2005, Watkins & Donnelly 2005). Storing scientific catalogues in electronic archives, remotely accessible through electronic websites, is valuable in making distant (particularly

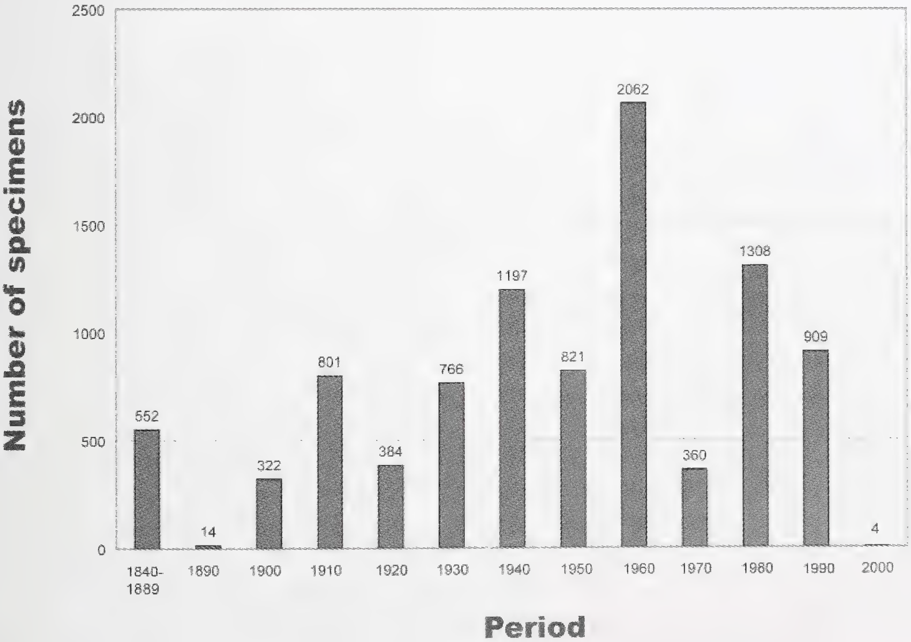

Figure 1. Number of bird specimens in 18 Cuban collections by period of collection, 1840–2003. The period 1840–89 includes 442 specimens collected by Juan Gundlach and eight specimens by others. These are grouped into the 50-year period because none of the Gundlach specimens has year data. The specimens from 1890–2000 are grouped by decade.

TABLE 3

Numbers of specimens of Cuban bird species considered of special concern, following Adams *et al.* (2003) and González Alonso (2002), in 18 Cuban collections.

Species	Status[1] Adams *et al.* (2003)	González Alonso (2002)	Number of specimens
Black-capped Petrel *Pterodroma hasitata*	-	EN	2
White-tailed Tropicbird *Phaethon lepturus*	-	EN	9
Scarlet Ibis *Eudocimus ruber*	-	VU	2
West Indian Whistling Duck *Dendrocygna arborea*	-	VU	39
White-cheeked Pintail *Anas bahamensis*	-	VU	31
Masked Duck *Nomonyx dominica*	-	VU	51
Hook-billed Kite *Chondrohierax uncinatus wilsonii*	CR	CR	11
Sharp-shinned Hawk *Accipiter striatus*	-	EN	33
Gundlach's Hawk *Accipiter gundlachi*	EN	VU	34
Zapata Rail *Cyanolimnas cerverai*	EN	EN	4
Sandhill Crane *Grus canadensis nesiotes*	-	EN	12
Snowy Plover *Charadrius alexandrinus*	-	EN	2
Piping Plover *Charadrius melodus*	-	VU	11
Roseate Tern *Sterna dougallii*	-	VU	13
White-crowned Pigeon *Patagioenas leucocephala*	-	VU	33
Plain Pigeon *Patagioenas inornata*	-	EN	33
Passenger Pigeon *Ectopistes migratorius*	EX	EX	5
Grey-fronted Quail-Dove *Geotrygon caniceps*	-	VU	23
Blue-headed Quail-Dove *Starnoenas cyanocephala*	-	VU	22
Cuban Macaw *Ara tricolor*	EX	EX	1
Cuban Parakeet *Aratinga euops*	-	VU	49
Cuban Parrot *Amazona leucocephala*	-	VU	126
Stygian Owl *Asio stygius*	-	VU	27
Bee Hummingbird *Mellisuga helenae*	-	VU	42
Fernandina's Flicker *Colaptes fernandinae*	EN	VU	32
Ivory-billed Woodpecker *Campephilus principalis*	CR	CR	15
Giant Kingbird *Tyrannus cubensis*	EN	EN	43
Thick-billed Vireo *Vireo crassirostris*	-	CR	10
Cuban Palm Crow *Corvus minutus*	-	VU	2
Zapata Wren *Ferminia cerverai*	-	EN	11
Cuban Solitaire *Myadestes elisabeth*	-	VU	41
Bicknell's Thrush *Catharus bicknelli*	-	VU	5
Bahama Mockingbird *Mimus gundlachii*	-	VU	5
Bachman's Warbler *Vermivora bachmanii*	CR	CR	14
Bananaquit *Coereba flaveola*	-	VU	1
Black-faced Grassquit *Tiaris bicolor*	-	VU	4
Zapata Sparrow *Torreornis inexpectata*	EN	VU	48
Painted Bunting *Passerina ciris*	-	VU	17

[1] Status: EX = Extinct, CR = Critically Endangered, EN = Endangered, VU = Vulnerable. Categories follow BirdLife International (2000).

TABLE 4
Cuban bird specimens in collections in several European and US institutions.

Name of collection	**No. of Cuban specimens**
EUROPE	
Institut für Zoologie, Halle	657
Natural History Museum, Tring	414
Muséum National d'Histoire Naturelle, Paris	360
Musée d'Histoire Naturelle de Neuchâtel	158
Staatliches Museum für Naturkunde, Karlsruhe	56
Liverpool Museum	23
Musée d'Histoire Naturelle, Geneva	16
Zoologisches Museum, Universität Hamburg	13
Natural History Museum Bern	8
Natural History Museum of St Gallen, Switzerland	4
The Manchester Museum	2
Universiteit van Amsterdam	1
Subtotal	1,712
UNITED STATES OF AMERICA	
US National Museum of Natural History[1]	3,227
American Museum of Natural History	1,312
Field Museum of Natural History	1,044
Carnegie Museum	1,008
Museum of Comparative Zoology	858
Peabody Museum, Yale University	676
University of Michigan	274
Academy of Natural Sciences of Philadelphia	235
Louisiana State University	231
Cornell University	208
University of Florida	165
Delaware Museum of Natural History	75
Museum of Vertebrate Zoology, University of California	18
San Diego Museum of Natural History	6
California Academy of Sciences	5
Los Angeles County Museum	1
Subtotals	9,343
Total	11,055

[1] Not all Cuban specimens have been catalogued in the USNMNH collection.

isolated) researchers aware of the potential data currently in museum collections (Beolchini 2002, Green & Scharlemann 2003). In addition, electronic databases greatly facilitate collection management (Green & Scharlemann 2003). With current technology and interest, the vision of a virtual world museum, providing a globally distributed biodiversity information network, is attainable (Cooper & Steinheimer 2003, Peterson *et al*. 2003).

The survey we have completed and the resulting electronic database will serve to improve data exchanges among Cuban scientists, and between them and international workers (Alberch 1993, Cooper & Steinheimer 2003, Peterson *et al*. 2005, Watkins & Donnelly 2005). Due to past communication difficulties in Cuba, there has been little inter-institutional interaction or resource-sharing. In fact, some collections have gone essentially unknown in recent years; e.g., the Instituto de Segunda Enseñanza, which contains several specimens of special concern in Cuba, was unknown to curators of the other Cuban collections until 2006 when we 'rediscovered' it.

Cuban collections have many national and international values. Collections are a rich source of information on the natural history, ecology, systematics and conservation of birds (Fitzpatrick 1985, Remsen 1995). Specimen collections are important depositories of the biodiversity of regions and nations, providing information on spatial and temporal variation in species, and thereby serving as a vital tool for inventorying biological diversity (Alberch 1993, Davis 1996, Mehrhoff 1996, Stork *et al*. 1996, Winker 1996, Shaffer *et al*. 1998, Taub 1998, Brooke 2000, Krishtalka & Humphrey 2000, Roselaar 2003, Watkins & Donnelly 2005), a process that has been initiated in Cuba recently. Collar & Rudyanto (2003) noted that museums also hold contentious specimens that require re-evaluation. Moreover, Cuban collections have an important role in the natural and national heritage of the island.

The bird collections in Cuba are substantial, totalling 10,415 Cuban specimens. A cursory survey of several European and US collections with Cuban specimens yielded a total of 11,055 skins, mounts and eggs (Table 4), slightly greater than the number of Cuban specimens in the island. Most avian collections have acquired few new specimens in recent decades relative to the rates of the late 19th and early 20th centuries (Remsen 1995, Winker 1996, Green & Scharlemann 2003). Thus, the specimens that exist now in museums are largely irreplaceable (Rasmussen & Prŷs-Jones 2003). The value of the present collections in Cuba is considerable, especially given the unlikely prospect of adding substantial numbers of specimens in the future.

Unfortunately, the specimens in Cuban collections often are missing complete or, indeed, any data. Specimens lacking data certainly are not unusual in collections and do possess value (Rasmussen & Prŷs-Jones 2003). As often the case (Rasmussen & Prŷs-Jones 2003), older specimens in Cuban collections (all of those from Gundlach) have few or no associated data. Gundlach, like other early collectors, was apparently unaware of the importance of date and specific locality data, and, regrettably, no field journals are known from his work. Nevertheless, Olson (1986) demonstrated that a specimen without data may turn out to be something as valuable as a unique type, even if it takes 160 years for someone to recognise the fact.

Many of the Cuban collections included here are quite small, yet several hold specimens important to our understanding of species' status and distribution; e.g., the Mayarí museum, with just 46 specimens, contains one the country's two specimens of Tundra Swan *Cygnus columbianus* and one of the three specimens of Black-headed Gull *Larus ridibundus*. Small provincial institutions can play an important conservation role in Cuba. As suggested by Hromada *et al*. (2003) and Cheke (2003), even small regional museums may have local expertise, ability to respond quickly to local issues and collect significant conservation data.

In our inventory, we found that several collections contained specimens of species (*n*=36) of local or international concern. Adams *et al*. (2003) emphasised the importance of publishing museum holdings of extinct and endangered species, which they considered a valuable contribution to conservation information.

Although the Gundlach collection has remained mostly intact within Cuba, many of the specimens formerly housed in Cuban institutions were dispersed outside the country. For example, the important Charles T. Ramsden (1876–1951) collection, which contained the best representation of forms from the Oriente (P. Bartsch *in litt*. to A. Wetmore, 25 November 1952), was given to USNMNH by Ramsden's widow, Emereciana Cristina Ferrer Joli de Ramsden, shortly after his death. Some 1,773 bird skins, 75 skeletons and 243 eggs were retained by USNMNH, whereas 476 specimens were returned to Cuba because they lacked complete data. The residual collection was donated to the Universidad de Oriente by

Ramsden's widow and Concepción Ramsden Ferrer de Bueno, where it was initially well curated by Manuel Díaz-Piferrer, a biology professor. After Díaz-Piferrer left the university, and until recently, however, the collection received little attention. Sadly, many bird specimens suffered substantial deterioration and were discarded, as was the bulk of the precious egg collection.

Fortunately for Cuban biologists, several important collections have been maintained in Cuba because access to foreign collections, particularly in the US, where 43.5% of Cuban specimens are housed, has been limited due to political tensions. Still, the Cuban collections have not been widely used, or indeed known, among Cuban workers. We trust that present efforts will help to correct that situation.

Conservation needs

In the current period of economic hardship, all Cuban natural history institutions and collections require international assistance in improving facilities for the maintenance of specimens. Whereas the MNHNC has received good cabinets through a donation from North American institutions and the collection facility is climate controlled, this is a unique situation. All other collections are in need of improved storage facilities and climate control. All require regular pest control, which has not been available in the island in recent years. Additionally, many Cuban collections are unorganised or only poorly arranged and managed, and only a few have a dedicated computer and associated software for use in managing the collections. Furthermore, most collections are in need of a thorough survey to properly identify specimens and to standardise nomenclature.

Several collections examined have been neglected for long periods. The practice of discarding damaged or 'useless' specimens continues in some collections, although such specimens and their associated data are still valuable as vouchers and to the assessment of the country's biodiversity. The specimens forming the bird collection in the Museo 'Tomás Romay' were salvaged from a trash bin after being discarded by another institution! Even more tragically, some important collections have already been lost; e.g., Wiley arrived at the Escuela 'Rafael María Mendive' (Colegio Dolores) collection in May 2006 only to learn that it had been destroyed (except for four severely damaged specimens) during renovations the year before. Sadly, that collection reportedly had contained several important specimens, including an example of the extinct Cuban Macaw and Critically Endangered Cuban race of Ivory-billed Woodpecker *Campephilus principalis bairdii*. Only 19 specimens of the macaw are known, with the only individual in Cuba held in the Instituto de Ecología y Sistemática. We appeal to the international community for assistance in ensuring that the avian collections of Cuba survive.

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Natural history data for the canopy-dwelling purpletufts *Iodopleura* (Cotingidae), and first documentation of Dusky Purpletuft *I. fusca* for Brazil

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Purpletufts *Iodopleura* Lesson, 1839, belong to the exclusively Neotropical family, Cotingidae, which includes some of the most diverse, colourful and spectacular passerines in South America, if not the world. However, as currently recognised, the family comprises diverse genera that are only dubiously included within it. The extreme diversity in form, plumage and behaviour suggests that Cotingidae has become a 'dumping ground' for several unrelated lineages with tyrannoid ancestors (Snow 2004). Initially, Sibley & Ahlquist (1990) postulated that the genera *Tityra*, *Schiffornis* and *Pachyramphus* form a distinct group, which they considered to be most closely related to the Tyrannidae, and which became known as the Schiffornis group. By the start of the next decade, work by Prum *et al*. (2000) wrought a change, with the result that genera *Tityra* through *Phibalura* were placed tentatively in Cotingidae. However, further genetic studies (Irestedt *et al*. 2002, Chesser 2004) have confirmed that the genera *Tityra* through at least *Pachyramphus* form a monophyletic group, which Chesser (2004) considered to be more closely related to manakins (Pipridae) than to cotingas. In consequence, many authors now treat *Tityra*, *Schiffornis*, *Laniocera*, *Iodopleura*, *Laniisoma*, *Xenopsaris*, *Pachyramphus* and *Piprites* as Incertae Sedis.

The genus *Iodopleura* occurs only east of the Andes where it is represented by three allopatric canopy species, Dusky Purpletuft *I. fusca*, White-browed Purpletuft *I. isabellae* and Buff-throated Purpletuft *I. pipra*. Their English name derives from the males' long silky and glossy, purple to lilac upper-flank (pectoral) tufts, which are white or absent in females.

I. isabellae is the best known and most widespread of the genus, being fairly common over much of Amazonia, from the west of the basin and upper río Orinoco drainage in southern Venezuela, south-east Colombia, eastern Ecuador and eastern Peru to extreme northern Bolivia (Pando) and Brazil (east to Pará and Maranhão) (Sick 1993, Snow 2004). *I. fusca* replaces *I. isabellae* in the Guianan Shield, over east and south-east Venezuela, the Guianas and adjacent northern Brazil, in Roraima and Amapá, and probably south to the Manaus area (Snow 2004). These two species inhabit *terra firme* forest whilst *I. pipra* is restricted to the Atlantic Forest of eastern Brazil and is globally threatened (BirdLife International 2004), with nominate *I. p. pipra* ranging from Espírito Santo south to São Paulo, whilst *I. p. leucopygia* occurs in north-east Brazil, from Paraíba and Pernambuco to Bahia (Snow 2004).

Dusky Purpletuft *Iodopleura fusca*

First documented Brazilian record.—During field work on 11 June 2000, AW located three *I. fusca* *c*.11 km north of Presidente Figueiredo, at Iracema Falls, Amazonas, Brazil (02°58′S, 60°02′W). Observations were made using 10×40 binoculars and a 35–60× telescope in excellent light, from a dirt road bisecting the forest. The purpletufts, as is typical of the genus, were perched at 35–40 m in the crown of a tall emergent legume, in primary *terra firme* forest. The birds uttered a thin but shrill repeated *seeee* which AW tape-recorded, and is similar to *I. isabellae* calls (AW pers. obs.). This tape-recording represents the first documentation for *I. fusca* in Brazil and is archived at both the Arquivo Sonoro Elias P.

Coelho (ASEC), Universidade Federal do Rio Janeiro, Brazil, and at the British Library National Sound Archive (BLNS), London, UK.

Records from Amazonas state.—The first Brazilian records of *I. fusca* involved a series of sightings *c*.80 km north of Manaus at the Biological Dynamics of Forest Fragments Project (BDFFP) in December 1984 (Stotz & Bierregaard 1989). In April 1985, Willis & Oniki (1988a) reported sightings of *I. isabellae* at Balbina, 130 km north-northeast of Manaus, but these almost certainly refer to *I. fusca* (pers. obs.). Subsequently, in 1987, AW and M. Cohn-Haft observed *I. fusca* at the same BDFFP reserve (see Cohn-Haft *et al*. 1997), in virgin *terra firme*; one pair, possibly two, on six dates between 20 October and 6 November, whilst on 21 August 2005, GMK located 1–2 birds. All these records are from the same general area as those made by Stotz & Bierregaard (1989). The BDFFP records, at 02°20'S, appear to represent the southernmost range limit of *I. fusca*.

Status.—The Iracema records represent the rediscovery of *I. fusca* north of Manaus, following the initial reports in the 1980s. Despite extensive field work by multiple competent ornithologists in 1988–2000, in pristine purpletuft habitat in *terra firme* north of Manaus (where three canopy towers are located), no field records were made. Furthermore, research into the canopy avifauna by Naka (2004) from these towers (117 hours at each one) also failed to produce any sightings, strongly suggesting that the species is a rare resident that is patchily and very locally distributed in the Manaus region. Nonetheless, the species' tiny size, canopy habitat and simple voice combine to make the birds difficult to detect. Further north (towards the centre of its distribution), we speculate that *I. fusca* may be more common and widespread than present knowledge suggests. For example, in Bolívar, south-east Venezuela, during two visits to *terra firme c*.20 km west of Santa Elena de Uairén, AW located two pairs of *I. fusca* on 2 April 2003 and 13 February 2004, on which date he tape-recorded a pair. The tape-recording appears to represent only the second confirmed Venezuelan record, following two specimens from a single locality in southern Bolívar (Hilty 2003), and is archived at BLNS. Presently, the species is considered uncommon to rare (Snow 2004), from a sparse number of field records and few specimens. Ridgely & Tudor (1994) suggested that *I. fusca* is less rare in French Guiana than elsewhere, as Tostain *et al*. (1992) reported numerous sightings from that country and J. Ingels (*in litt*. 2007) confirms, for instance, that it is seen regularly around the village of Saül, in the interior of the country.

Altitudinal range.—AW's Bolívar observations at *c*.900 m increase the known altitudinal range of *I. fusca* by some 400 m (Hilty 2003, Snow 2004).

Plumage details.—Prolonged studies of the three *I. fusca* at Iracema permitted AW to note the following plumage variation. Two of the three were males, with striking purple upper-flank tufts, clearly visible through the telescope as a purple triangle on the sides of the upper breast at the wing-bend. Although AW had previously searched very carefully for this field mark during all previous field encounters with *I. fusca* (many under excellent conditions), he had failed to observe this feature using binoculars. One of the males was more boldly marked below, with heavier horizontal flanks barring and more pronounced scaling on the upper breast. The female was noted to be overall slightly duller than the other two birds. *I. fusca* is not known to be sexually dimorphic, except in the lack of pectoral tufts, and this individual was perhaps an immature or its plumage had faded. Juveniles, however, have been reported to have conspicuously white-tipped feathers (Snow 2004). On 26 September 2006 whilst closely observing a female through the telescope, AW noticed a distinct symmetrical white throat stripe (*c*.0.5 cm wide and 1 cm long) from the bill base and an indistinct small white smudge in front of the eyes. Careful comparison of specimens may shed light on any subtle sexual, individual or age-related plumage differences in the species, though no such is obvious in the seven specimens (three male, one of which is perhaps young, and four female) from British Guiana held at The Natural History Museum (Tring, UK) or those two (one male and one female) from Venezuela at the Collección Ornitología Phelps, Caracas (GMK pers. obs.).

Feeding behaviour.—*I. fusca* were observed by AW sallying for flying insects from tree crowns using both vertical and horizontal upward-looping sally-flights of mostly 10–15 m, usually returning to the same perch or the same tree crown. Very similar foraging behaviour exists in Swallow-wing *Chelidoptera tenebrosa*, but the latter species' sally-flights are frequently much longer and they occasionally visit the ground (AW pers. obs.). Purpletufts look very much like miniature Swallow-wings, especially when sallying, having similar (but much smaller) rather broad wings which are noticeable when gliding back to the perch. One *I. fusca* caught a *c*.1-cm moth after a successful upward sally which ended in the bird returning to the same dead canopy snag, where the prey was consumed. On 27 September 2006, at 17.40 h, a female was observed repeatedly sallying to catch *c*.1-cm winged termites (*Isoptera*) or *Hymenoptera* at a hatching event. The longest observed was a *c*.25 m vertical sally ending in an upward swoop to catch the insect, before landing in a nearby tree crown.

Roosting behaviour.—On 11 June 2000, at 17.50 h, AW observed three *I. fusca* at Iracema going to roost in the crown of the legume where he originally discovered them. They were using the topmost, exposed and mostly bare branches at *c*.35–45 m, perching 0.5, 1.0 and 4.5 m apart. The tree offered little or no protection against the elements, as the twigs held only a few tiny leaves and some dried black seedpods. They perched motionless *c*.1 m from the top of the tree, very erect, like miniature *Chelidoptera tenebrosa*, with their tails held vertically down. On subsequent visits at dusk, in August 2000, 2001, 2003, June and August 2005 and September 2006, AW encountered presumably the same 2–3 birds on the same tree crown on four occasions, confirming that they used the same tree for roosting over at least six years.

Voice.—At 17.45 h on 12 August 2005 AW tape-recorded three *I. fusca* chasing each other in the canopy, prior to roosting, uttering a more complex vocalisation that is possibly the song. It comprised a series of five short 'jingly trills' uttered over a five-second period and repeated after 22 seconds. Unfortunately, he was unable to determine if any of the birds were displaying due to the poor angle and brief views. This call is included on a commercially available CD (Stouffer *et al*. 2007) and is very similar to the display-song of *I. isabellae* on Marantz & Zimmer (2006), which AW has also tape-recorded along the río Napo, dpto. Loreto, Peru, and near Parque Indígena do Xingu, Mato Grosso, Brazil.

White-browed Purpletuft *Iodopleura isabellae*

Nesting.—On 21 January 2001, from a canopy platform in *terra firme* at Loreto, Peru, AW observed a group of three *I. isabellae*, of which at least two, presumably a pair, were nest building. A 20–60× telescope permitted exceptional studies of their behaviour. We follow Simon & Pacheco's (2005) standardisation of nest descriptions for Neotropical birds. The nest was being constructing in the canopy of an open-crowned legume, sparsely foliated with tiny compound leaves, and *c*.30–35 m tall. The nest was 4–5 m from the tree's top on a small open, almost horizontal branch, apparently with a small knot hole, where the low cup/base nest was placed, saddling the branch 1 m from the tip, and looking somewhat like a hummingbird nest. Within 30 cm of the nest were five 5–7 cm black bean pods, a feature we have also noted at nests of *I. pipra* in São Paulo and Rio de Janeiro states (AW & GMK pers. obs.). The three birds repeatedly flew to the nest tree, where one bird (possibly a youngster from the previous nesting) would perch within *c*.1 m of the nest, and the pair undertook their construction work. They repeatedly brought cobwebs in their bills, taking it in turn to land on top of the nest, then carefully rotating in a clockwise direction, slowly 'padding' with their feet whilst carefully placing the cobwebs in the shallow cup edge with their bills. Several times, AW observed both birds, especially the larger (presumably the male), defecating on the side of the nest then working the excrement into the nest with the bill. Once some sticky substance was seen in the bill of one bird; after landing on the nest it wiped its bill multiple times, working this also into the side of the nest. This substance may have been regurgitated sticky seeds, e.g. mistletoe (Loranthaceae), which is regularly taken by *Iodopleura* (Snow 1982, 2004, Sick 1993), and may well help to 'cement' the nest. AW observed similar behaviour from Yellow-crowned Tyrannulets *Tyrannulus elatus* nest building in the canopy of an emergent in *terra firme* at Manaus, using their bills whilst in the nest to cement multiple yellow mistletoe seeds with either its own saliva or the natural sticky pulp of the seeds, by 'gluing' them to the nest rim (AW pers. obs.).

Very similar behaviour was reported at the only other documented nest of *I. isabellae* (Sick 1979), in Pará, Brazil, where, in November 1977, a pair was observed constructing a nest, a thin pad of spider's webs on a slender horizontal branch. A third bird kept company but showed no interest in the construction. Two weeks later the nest appeared finished but no eggs had been laid; it was attached saddle-like and appeared like a cup-shaped hummingbird's nest, measuring 3.0 × 3.4 cm, its depth barely 1 cm. Outside, it was coated so thickly with cobwebs that the underlying materials were invisible; the smooth surface resembled papier-mâché. Sick suggested that saliva might have been used to mat the cobwebs together. AW's observations confirm the suspicion that purpletufts do use other substances, e.g. excrement, to help 'cement' the nest. The only other breeding data involve a stub-tailed fledgling observed on 20 November near Belém (Sick 1979), a female with active ovaries taken on 5 October in Amazonas, Brazil (specimen in the Museu Nacional, Rio de Janeiro), three males from south-east Colombia that were in breeding condition in August–September (specimens in Colección Ornitología Phelps, Caracas), and an unpublished observation (by J. Thompson and C. J. Sharpe) of a nest-building pair at a forest border, at Junglaven, Amazonas, Venezuela, on 12 March 2004.

Display.—During the nest-building observations, AW witnessed apparently the first documented display by any purpletuft in the field, from a male *I. isabellae*. After *c*.15 minutes observing the three purpletufts at the nest, two more birds approached, whereupon immediately one of the three chased the new arrivals, pursuing them through the treetops and away from the nest. Upon returning to the nest, it landed atop a nearby tree and engaged in a spectacular display, transforming itself by flaring its long, intense purple, upper-flank feathers over two-thirds of the breast, leaving only a small white centre. The purple feathers even curled around over the bird's nape, forming a purple-collared effect in side view. This impressive display was emphasised by the sunlight, as the bird remained perched for *c*.30 seconds in the tree crown before flying off.

We predict that males of both *I. fusca* and *I. pipra* use their long colourful, modified upper-flank feathers in a similar manner, in an as yet undescribed courtship display. It is also unknown if the shorter white flank-feathers of female purpletufts possess any function in courtship. Snow (1982) noted a male *I. pipra*, obtained alive, raising and spreading the violet flank feathers when aroused; when calm they were half-covered by the dark breast feathers. Snow further suggested that doubtless these modified feathers are used by the males in courtship, without offering details.

Buff-throated Purpletuft *Iodopleura pipra*

Plumage variation.—*I. pipra* comprises two subspecies: *leucopygia* differs from nominate *pipra* in having a broad white rump band and the buff throat purer (less suffused grey) and more extensive (Snow 1982, 2004).

Nesting.—Previous breeding records of nominate *I. pipra* have all been from lowland São Paulo in late winter (Willis & Oniki 1988b), with a lone spring (October) record (Collar *et al.* 1992). AW and K. J. Zimmer found two nests of nominate *I. pipra* at Fazenda Capricórnio, Ubatuba, São Paulo. On 14 October 1994 they located a nest in a 20-m leafless legume within a shaded active cacao plantation, adjacent to virgin Atlantic Forest. The nest was *c.*15 m up and near the centre of the tree. The easily overlooked nest was a low cup/fork (see Fig. 2d in Simon & Pacheco 2005), hugging an almost horizontal branch in a gentle depression where three smaller, almost horizontal branches forked. It contained a three-quarters grown, partially feathered nestling which was being fed by at least two adults every few minutes. Adults were seen regurgitating small white berries near the nest. Some 200 m away, we encountered three more purpletufts, two of which were chasing each other in the canopy of a leafless 30-m tall tree with much wing- and tail-quivering. One engaged in highly exaggerated wing-lifting, holding the wings in a 'V'. These observations may have been of a recently fledged youngster food-begging.

On 15 October 1995, along the entrance road to Fazenda Capricórnio, while observing a perched purpletuft through a 30× telescope during a rainstorm, AW noticed that the bird was brooding, as the bill of a single nestling was just visible amongst the brooding adult's breast-feathers. The nest was so small and the brooding adult so erect as to make the nest practically invisible. Willis & Oniki (1988b) also noted that nestlings of *I. pipra* perfectly imitate the nest colour. This nest was *c.*17 m up in a bare legume, locally called 'farinha seca' and was also a tiny low cup/fork nest where four horizontal branches radiated. The nest was 1.5 m from the main trunk. Again, a second bird was noted perching motionless *c.*0.5 m above the nest for 3–4 minutes.

On 22 October 1998, near Mambucaba / Perequê, Rio de Janeiro, GMK was shown an abandoned nest (active a week or so earlier) in a *Cecropia* (*c.*10 m tall), on one of the pair of topmost horizontal branches. The nest was positioned close to the end of the branch and was highly inconspicuous, looking almost like a bump on the bark, being scarcely a couple of cm high. On 21 September 2007, at Fazenda Angelim, Ubatuba, GMK observed two nests of *I. pipra*, at the edges of a clearing surrounded by an abandoned shade cacao plantation, situated *c.*400 m apart. The first nest was under construction, apparently solely by the female, though the male 'stood sentinel' and occasionally expanded the pectoral tufts as his mate collected nest material. It was sited at *c.*10 m above ground in a central two-way fork within 2–3 m of the crown of a near-leafless legume. The female collected fresh lichens from within 2 m of the ground in nearby trees. Subsequently, on 19 October 2007, the female was observed at the nest, apparently incubating, several times during the day which was overcast with periodic rain showers, sometimes heavy. The male occasionally perched close by. The second nest, sited *c.*20 m above ground, also in a two-way fork, close to the topmost branches of another leafless legume, already contained a single, several-day-old young, being brooded by the adult female. The male again remained close by and both adults were observed to agressively chase a Rufous-bellied Thrush *Turdus rufiventris* which approached to within 1 m of the nest. However, a Green-headed Tanager *Tangara seledon* that perched a similar distance from the nest was not subject to such attention (see also Agonistic behaviour). On 19 October only the single young, by now adult-sized and similarly plumaged, but still perched on the nest was present. The nest tree was by this time in leaf.

GMK has also observed different incubating birds at Fazenda Angelim, Ubatuba, in October 2000 and August 2002. These nests matched the descriptions given above.

Previous published nesting records for nominate *I. pipra* involve two (tiny cup) nests near Ubatuba, 20–25 m high in tall leafless leguminous trees, each with one young, on 10 August 1986; the nests were within 70 m of each other (Willis & Oniki 1988b). A three-quarters-grown chick was noted near Ubatuba, on 11 October 1991, in a nest 12 m above ground in a bare tree within an overgrown cacao plantation (Collar *et al*. 1992). The only known breeding datum for *I. p. leucopygia* comes from the highlands of Serra Branca, Murici, Alagoas, where on 10 May 1984 a nesting pair (originally ascribed to *I. isabellae*) was observed and the nest collected (Teixeira *et al*. 1987). The nest was positively compared with the description of Sick (1979) for that of *I. isabellae*, causing the initial misidentification to species, which the authors later corrected (Teixeira *et al*. 1990). We have also seen the photograph of another nest (posted at www.surfbirds.com), taken on 10 August 2005, by N. Athanas, which contained a downy young obviously at least several days old.

Agonistic behaviour.—Approximately 30 cm below the *I. pipra* nest found on 14 October 1994, a pair of Crested Becards *Pachyramphus validus* was constructing a typical closed/globular nest of moss attached to a fork. One of the purpletufts remained perched in the same tree and *c*.5 m from the nest for five minutes. Almost every time the much larger becards (mostly the female) approached their nest with nesting material, the smaller purpletufts attempted to chase them off. Two days later, AW observed a pair of *Iodopleura* atop a legume chasing a Sayaca Tanager *Thraupis sayaca* within an overgrown cacao plantation, *c*.1 km from the active nest.

Feeding behaviour.—AW has observed *I. pipra* at Ubatuba to engage in 2–5 m circular sallies for insects within the crown of a nesting legume. At Boa Nova, Bahia, on 2 February 1999, AW observed a lone *I. p. leucopygia* foraging from the top of a *c*.15 m legume at the edge of a corridor of Atlantic Forest. The behaviour was very reminiscent of *I. fusca* and *Chelidoptera tenebrosa*, involving three *c*.10–15 m looping upward sallies to catch unidentified flying insects before returning to the same perch. We have numerous observations of perch-gleaning for mistletoe in clumps on larger trees, as well as taking small yellowish berries from a vine in the subcanopy.

Mobbing behaviour.—During field work in remnant Atlantic Forest at Boa Nova, Bahia, AW and K. J. Zimmer noted that *I. p. leucopygia* is readily located using either playback or by imitating the song of Brazilian Pygmy-owl *Glaucidium minutissimum* at forest edges with a clear view of the canopy. Purpletufts often approach to investigate an owl mobbing scene, perching in the tree crowns agitatedly giving a thin two-syllable whistle whilst raising the somewhat elongated crown-feathers. This method may prove useful to field workers seeking this species, which is easily overlooked, and it might also be considered by ornithologists in south-east Brazil searching for the Critically Endangered Kinglet Calyptura *Calyptura cristata*, whose voice is still unknown (Pacheco & Fonseca 2001) and is reminiscent of a miniature purpletuft in size.

Altitudinal movements.—Breeding in coastal lowlands during winter and spring, *I. pipra* has been suggested to undertake altitudinal movements to higher elevations during the summer, based principally on the observation of small flocks 'migrating' at 900 m in Espírito Santo, in November (Sick 1993). In the north-east Atlantic Forest, however, it would seem probable that subspecies *leucopygia* is resident at highland localities based on available data (Teixeira *et al*. 1987, 1990, Collar *et al*. 1992; AW pers. obs., GMK pers. obs., E. Endrigo & L. F. Silveira *in litt*. 2006), especially given the almost total loss of lowland forest in this region of Brazil, except in Bahia where some important remnants remain. Even in the range of nominate *pipra*, multiple recent observations in the lowlands of São Paulo, at Ubatuba, are available from all months, except June (GMK pers. obs., E. Endrigo, L. F. Silveira, C. Rizzo & J. Minns *in litt*. 2006), only records below 500 m are available from the environs of Parati, in nearby Rio de Janeiro state (Browne 2005), and there are records from highland localities between São Paulo and Espírito Santo at seasons other than summer (Camargo & Camargo 1964, Collar *et al*. 1992; E. O. Willis *in litt*. 2007), all of which casts some doubt on the migration theory. In this respect, it is perhaps worth noting that a record in the Collar *et al*. volume, that from Macaé de Cima, Rio de Janeiro, cited as being made in May 1986, is actually attributable to 6 March 1986 (J. F. Pacheco *in litt*. 2007). Willis has previously unpublished records from the (highland) Santa Teresa region, Espírito Santo, in early September 1989 and late July 1993. Around Perequê, Rio de Janeiro, R. Parrini (*in litt*. 2006) has records in June, July and November (in addition to the October nest record mentioned above), whilst in the Serra dos Órgãos, in the environs of Teresópolis, the same observer has observed a single at 300 m (12 May 1996), a group of five at 700 m (27 December 1992), with another record at 900 m (date lost). These latter data might tend to support the migration hypothesis, but until more accurate information concerning the species' overall range become available, based on more uniformly distributed observer effort, it might just as well signal that the species is more widespread than generally appreciated.

Conservation.—That *I. pipra* may undertake altitudinal migrations, or perhaps more likely local movements, would have serious consequences for its conservation, as habitat requirements are twice as great as those for sedentary species, and would include both mid-elevation and lowland Atlantic Forest. It is, therefore, extremely important that research focuses on learning more about the movements, if any, of this poorly known bird, as it could be at greater risk than most endemics, particularly due to the loss of lowland Atlantic Forest.

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Invalid specimen records of Saffron-cowled Blackbird *Xanthopsar flavus* from Argentina and Paraguay

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Properly labeled museum specimens represent a principal data source for avian distributions. In the case of rare and threatened species, specimens document past localities and may provide evidence of historical range contractions (Collar *et al*. 1992), which is one of the main criteria for assigning threat status (Mace & Stuart 1991). Most reviews of the ranges of such taxa assume correct identification of skins, making it important to report incorrectly labelled museum specimens.

Saffron-cowled Blackbird *Xanthopsar flavus* is currently considered Vulnerable (BirdLife International 2004). Five specimens attributed to this species held in the Instituto Miguel Lillo, Tucumán, Argentina, are misidentified. I personally checked the specimens and their labels on 9 November 2006. Specimen numbers are those of the Lillo collection.

Specimen 02931 was collected by J. Esteban on 10 November 1944 at Colonia Dalmacia, prov. Formosa, Argentina, near the río Monte Lindo. It is an immature male Unicoloured Blackbird *Agelasticus cyanopus*, of the nominate race, with a female-type plumage but black cheeks. This transitional plumage was described by Parkes (1966). Because of its yellow underparts the specimen was wrongly labelled by the collector as Saffron-cowled Blackbird. The specimen was reported by Esteban (1953) and included by Collar *et al*. (1992) as the only such record of *X. flavus* for prov. Formosa. Specimens 05108 (male) and 05109 (female) were collected by S. Pierotti on 4 November 1947 at San Cosme, prov. Corrientes. The specimens are typical adult male and female Unicoloured Blackbirds of the nominate race. Both were reported by Esteban (1953) and included by Collar *et al*. (1992). These were the only specimen records of Saffron-cowled Blackbird for Corrientes west of the extensive Iberá marshes. On the other hand, there are several valid specimens of Saffron-cowled Blackbirds from eastern Corrientes, particularly in the Museo Argentino de Ciencias Naturales (MACN), Buenos Aires (e.g. Darrieu & Camperi 1994).

The remaining two specimens attributed to *X. flavus* are female Unicolored Blackbirds. Specimen 02941 was collected on 7 November 1903 by Venturi and Rodríguez at Mocoví, prov. Chaco, Argentina, according to the original label. However, M. Pearman (*in litt*. 2007) informs me than Mocoví is not in Chaco prov., but in north-east prov. Santa Fe, close to the provincial border. The specimen was not mentioned by Collar *et al*. (1992), though it was the only putative *X. flavus* specimen for prov. Chaco. Specimen 7914 was collected by 'S. P.' (S. Pierotti?), on 14 December 1944, at Río Apa, dpto. Concepción, Paraguay, on the border with Mato Grosso do Sul, Brazil. It was not mentioned by Collar *et al*. (1992) or any other similar source.

The original labels of these five were subsequently corrected by anonymous hands to *Agelaius cyanopus*, and the specimens are now kept with others of Unicoloured Blackbird, but the corrections were not made public. It appears that the Lillo collection has no valid specimens of Saffron-cowled Blackbird.

The persistent confusion of Saffron-cowled and Unicoloured Blackbirds was already mentioned by Hartert & Venturi (1909), but this comment was apparently ignored, perhaps because it was in French. Even the Swedish–Argentine ornithologist C. C. Olrog, who worked at the Lillo Institute, confused these icterids in his first field guide (Olrog 1959), as is evident from fig. 791. Olrog's first guide was the only one available to Argentine field workers until 1978 (pers. obs.). Sight records of Saffron-cowled Blackbirds from Argentina in the 1960s and 1970s are therefore somewhat suspect.

Another plausible outcome of my findings concerns the past distribution of Saffron-cowled Blackbird in north-east Argentina. The existence of historical populations in Chaco and Formosa could be considered hypothetical, as there is no longer documentation for its presence there. The two valid specimens from Santa Fe in the Museo de Entre Ríos (Freiberg 1943) were collected near the city of Santa Fe, *c.*380 km south of Mocoví and outside the *Chaco* biogeographical region (Fraga *et al.* 1998). There is no irrefutable evidence that Saffron-cowled Blackbird has retracted its range in the *Chaco* in recent history. We therefore have evidence of a range retraction only in prov. Buenos Aires, in the *Pampas* region; this drastic decline is evidenced by several correctly identified specimens (Collar *et al.* 1992, Fraga *et al.* 1998).

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Three new species and novel distributional data for birds in Uruguay

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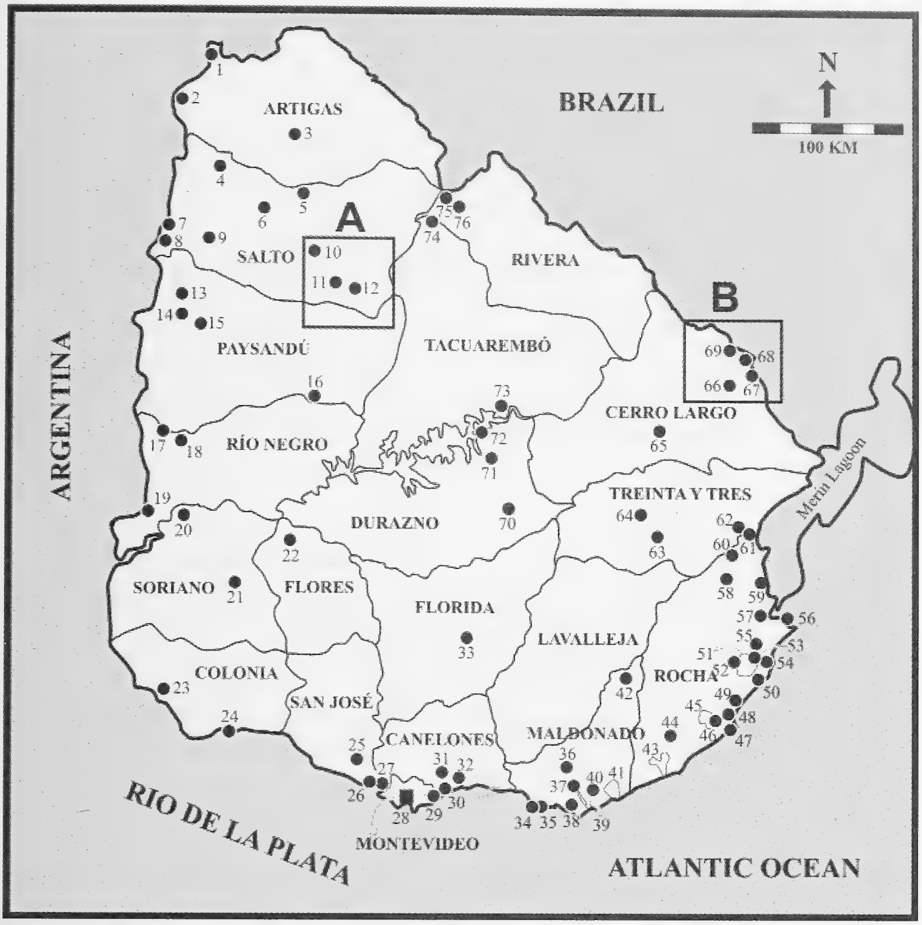
Uruguay lies in the south-eastern South America Pampas biome (*sensu* Stotz *et al*. 1996) and its avifauna contains elements of diverse zoogeographic origin. Aside of typical Pampas birds, the country harbours Chaco and Atlantic Forest species, as well as migrants from different parts of the Americas. Following pioneering studies in the 19th century, ornithological knowledge of Uruguay improved rapidly through the efforts of many workers, mostly since the 1950s. Cuello & Gerzenstein (1962) provided a comprehensive annotated list of the country's birds and the first precise distributional data for most species. Numerous contributions (frequently targeting specific groups or geographic regions) have updated or complemented the data therein but, surprisingly, no recent publication has provided detailed information (i.e. localities and dates) on the distribution of birds throughout Uruguay (though see Arballo & Cravino 1999 for a projected work).

Following a substantial increase in the number of professional and amateur ornithologists in the last 20 years, a significant number of new species have been added to the country's avifauna. Most were included in general lists of Uruguay's birds (Azpiroz 1997, Arballo & Cravino 1999, Azpiroz 2001, Claramunt & Cuello 2004), but specific data for only a few have been published. Here we update the status and distribution of 45 species, i.e. *c*.10% of the total avifauna, based on our own field work and by many others throughout Uruguay (Fig. 1). Species treated here occupy three main categories: a) those with no previously published records; b) species recently discovered in Uruguay with only very few records; and c) species with few or no recent observations (i.e. post-1980) in-country. Wherever possible, especially for difficult to identify species, we provide details of available evidence (e.g. specimens, recordings). Specimens, as well as copies of many other supporting materials mentioned in the text, have been deposited at the Museo Nacional de Historia Natural y Antropología (MNHN), Montevideo. In the accounts, our own observations are presented first, followed by those of others. The relevance of new records is discussed *vis à vis* previous data and against distribution and status in adjacent southernmost Brazil (i.e. Rio Grande do Sul) and eastern Argentina where relevant. Sequence follows that of Bencke (2001), whilst subspecies names are taken from Claramunt & Cuello (2004).

Species accounts

BROWN TINAMOU *Crypturellus obsoletus obsoletus*

On 25 February 1999, *c*.1 km south of Paso Centurión, dpto. Cerro Largo, three singles were seen (perhaps the same individual) in gallery forest. Next day one was heard in the same place (ABA). In 2006, *C. obsoletus* was seen and heard repeatedly in gallery forest along the río Yaguarón, between Paso Centurión and Paso Paiva, on 27–28 February (JLM), 18–19 June (ABA, JLM), 27 August (JLM), 15 and 17 October (JLM), 8 November (T. Rabau *in litt*. 2006) and 8–10 December (ABA, JLM). It was not found at Paso de Melo, also on the Yaguarón, in January 2000 (ABA). *C. obsoletus* was first recorded in Uruguay in December 1997, at Picada de Felipe, also on the Yaguarón, dpto. Cerro Largo (Arballo & Cravino 1999), where relocated subsequently (Rocha 2003). Our records are *c*.10 km to the south-east. Brown Tinamou is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B
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76

Figure 1. Localities mentioned in the text. *Artigas*: 1. Bella Unión; 2. Estancia San Pedro; 3. Diego Lamas. *Salto*: 4. Termas del Arapey; 5. Lavalleja; 6. Paso de las Piedras, río Arapey Grande; 7. Salto Grande dam; 8. Salto city; 9. San Antonio; 10. Boquerón de Cañas; 11. Cerros de Vera; 12. Arerunguá. *Paysandú*: 13. Chapicuy; 14. Termas de Guaviyú; 15. Establecimiento Santo Domingo; 16. Tres Árboles. Río Negro: 17. Paso de las Cadenas, arroyo Negro; 18. Establecimiento Los Cedros; 19. Estancia Mbopicuá. *Soriano*: 20. Arroyo Cololó; 21. Establecimiento Don Siba. *Flores*: 22. Cuchilla Marincho. *Colonia*: 23. Conchillas; 24. Punta Artilleros. *San José*: 25. Libertad; 26. Playa Pascual; 27. Playa Penino. Montevideo: 28. Montevideo city. Canelones: 29. Carrasco International Airport/Bañados de Carrasco; 30. Solymar; 31. Pando city; 32. Laguna del Cisne. Florida: 33. Estancia Pastorini. *Maldonado*: 34. Punta Colorada, 35. Punta Negra; 36. Sierra de Caracoles; 37. San Carlos; 38. Laguna del Diario; 39. Arroyo Maldonado marshes; 40. Cuchilla Maldonado; 41. Laguna José Ignacio; 42. Gruta de Salamanca. *Rocha*: 43. Laguna de Rocha; 44. Sierra de Chafalote; 45. Laguna de Castillos; 46. Refugio de Fauna Laguna de Castillos; 47. Cabo Polonio; 48. Valizas; 49. Aguas Dulces; 50. Balneario La Esmeralda; 51. Laguna Negra; 52. Colonia Vacacional Don Bosco; 53. Potrerillo de Santa Teresa; 54. Fortaleza de Santa Teresa; 55. Bañado de los Indios; 56. Chuy; 57. San Miguel National Park; 58. Bañado Tres Bocas; 59. Estero de Pelotas; 60. Cebollatí; 61. Isla del Padre. *Treinta y Tres*: 62. Enrique Martínez; 63. Treinta y Tres city; 64. Área Protegida Quebrada de los Cuervos. *Cerro Largo*: 65. Cerro Guazunambí; 66. Sierra de Ríos; 67. Paso Paiva; 68. Paso Centurión; 69. Paso de Melo. *Durazno*: 70. Cuchilla de los Manantiales; 71. La Paloma; 72. Picada de Oribe. *Tacuarembó*: 73. Rincón de Zamora; 74. Rincón de Vassoura. Rivera: 75. Masoller; 76. Valle del Lunarejo. Boxes A and B refer to the Arerunguá and Centurión areas (see text)

common in eastern Rio Grande do Sul (Belton 1994) and is known from the Brazilian side of the Yaguarón (Maurício & Dias 2001).

LITTLE BLUE HERON *Egretta caerulea*

In dpto. Rocha, on 14–15 September 2002, single adults (probably the same) were seen in the vicinity of Valizas and Laguna de Castillos, respectively (J. C. Gambarotta *in litt*. 2006), whilst on 13 September 2004 (J. C. Gambarotta *in litt*. 2006) and 9 July 2005 (G. Cortés *in litt*. 2006) an immature and adult, respectively, were near Valizas. Three pre-1920 records (Cuello & Gerzenstein 1962), with more recent observations from arroyo Valizas (September 1997) and Lascano (November 1994), dpto. Rocha, and isla Sauzal (March 1998) dpto. Soriano (Gambarotta *et al*. 1999, Arballo & Cravino 1999). Gore & Gepp (1978) suggested it might be a summer vagrant, but records are now also available for autumn/winter. Few observations in Rio Grande do Sul, most in autumn/winter (Belton 1994, Maurício & Dias 1996, 2000). In Argentina also rare with few records, mostly in the north (Mazar Barnett & Pearman 2001).

MUSCOVY DUCK *Cairina moschata*

On 7 November 1996, nine were near the río Uruguay, at estancia San Pedro (Arrocera Conti), *c*.18 km north-west of Colonia Palma, dpto. Artigas (ABA). Local people stated that the species formerly bred on isla del Zapallo in the same river. On 25 February 1999, five flew over the río Yaguarón, *c*.1 km south of Paso Centurión, dpto. Cerro Largo, with two pairs in the same area next day (ABA). On 20 July 2000, one flew over Balneario La Esmeralda, dpto. Rocha (ABA). On 27 November 2006, one was over Rincón de Zamora, just north of Paso Ramírez, dpto. Tacuarembó (ABA). On 7 December 2006, a pair was observed over the Yaguarón at Paso Paiva (ABA, JLM). Frequently noted on the río Cebollatí, around Enrique Martínez, dpto. Treinta y Tres, in April–September 1984 (J. C. Gambarotta *in litt*. 2006). On 4 December 1999, two females were seen on isla del Padre, on the río Cebollatí, dptos. Treinta y Tres / Rocha (C. Calimares *in litt*. 1999). Though more widespread formerly (Tremoleras 1920, Arballo & Cravino 1999), in the last 20 years it was reported only on the ríos Negro, Tacuarembó, Tacuarí and Uruguay (Arballo & Cravino 1999). Cuello & Gerzenstein (1962) and Gore & Gepp (1978) commented on the lack of records for southern Uruguay. Ours are the first for dpto. Rocha (the only recent record in southern Uruguay) and for the Yaguarón.

BICOLOURED HAWK *Accipiter bicolor pileatus*

Observed on 16 December 1995 and 25 February 1996, in gallery forest along arroyo Gajo del Lunarejo, *c*.10 km south-east of Masoller, dpto. Rivera (ABA); the only observations during a 14-month survey involving 4–5-day monthly visits, in February 1995–March 1996 (ABA), to the Valle del Lunarejo. On 10 June 2005, an adult was in arroyo Guaviyú, establecimiento Santo Domingo, *c*.25 km north-east of Quebracho, dpto. Paysandú, with a juvenile *Accipiter*, probably also *A. bicolor* seen there on the same day (ABA). On 11 November 2005, an active nest, initially found on 5 November (A. Ocampo pers. comm. 2005), was observed in arroyo Itapebí Grande, just east of San Antonio, dpto. Salto (ABA). The nest was regularly visited in early December 2005 but the birds were not seen again (A. Ocampo & G. Cortés pers. comm. 2005). In November 2003 and 2004, a pair was seen at a nest *c*.8–10 m atop a tall tree along the río Uruguay, at estancia Mbopicuá, 10 km east of Fray Bentos, dpto. Río Negro (J. Villalba Macías *in litt*. 2006). In late January 2004 three young were noted there and in January 2005 two. Several weeks later, all had left the site. During spring 2005 they were recorded again in the same area, but did not use the nest, which had been partially destroyed by strong winds (J. Villalba Macías *in litt*. 2006). The only Uruguayan specimens are an immature taken at San Diego, near the Yaguarón, dpto. Cerro Largo, in April 1960 (Cuello & Gerzenstein 1962), and another from San Gregorio, dpto. Artigas, in December 1980 (Huertas 1985). Also known from scattered sites in the north and east (Anon. 1998, Arballo & Cravino 1999), its range can now be extended to western Uruguay (first records for dpto. Rio Negro) and we present the first evidence of breeding. Suspected to be resident in Uruguay (Arballo & Cravino 1999), with records in December–April and once in winter (July 1995 in Salto), our records support the notion that at least some are sedentary. Considered rare in Rio Grande do Sul (Belton 1994) and in Entre Ríos, Argentina (de la Peña 1997).

SWAINSON'S HAWK *Buteo swainsoni*

Recorded at many sites between January 1995 and December 2006 (by ABA unless otherwise stated): dpto. Canelones (Carrasco International Airport); dpto. Colonia (near Conchillas; S. Alvarez *in litt*. 2006); dpto. Cerro Largo (*c*.10 km west of Paso Centurión); dpto. Durazno (5 km north of Sarandí del Yí and the environs of Cuchilla de los Manantiales); dpto. Flores (Route 3 km 227–230, Cuchilla Marincho); dpto. Maldonado (Sierra de Caracoles; ABA, and around San Carlos, Cerro de Eguzquiza and environs of Cuchilla de Maldonado; T. Rabau *in litt*. 2006, 2007); dpto Paysandú (around Tres Árboles, establecimiento Santo Domingo, and Route 3, km 465); dpto Río Negro (Route 3 km 314; T. Rabau *in litt*. 2006); dpto Rocha (Refugio de Fauna Laguna de Castillos; J. C. Gambarotta *in litt*. 2006, and isla del Padre, río Cebollatí; C. Calimares *in litt*. 1999); dpto. Salto (5 km south-east of San Antonio, 5 km west of Boquerón de Cañas; ABA, and around Salto; T. Rabau *in litt*. 2006); dpto. San José (Playa Penino); and dpto. Treinta y Tres (Route 8 km 260). Observations fall between 4 November and 27 February, with most (19) in December. Although many records involved singles (27 observations), several were of groups of 10–50. The largest flocks were in December 2000 (>100) at arroyo del Sarandí, establecimiento Santo Domingo, dpto. Paysandú, and on 19 (>100) and 23 December 2005 (>150) in an area of rolling grassland and woodland along Route 3, at Cuchilla Marincho, *c*.15 km south of Andresito, dpto. Flores. Prior to the 1980s there were only three reports in Uruguay (Cuello & Gerzenstein 1962), but *c*.20 observations have been published since 1987 (Arballo & Cravino 1999, Gambarotta *et al*. 1999, Anon. 2000). We present the first records for dptos. Treinta y Tres, Flores and Paysandú, it being a regular visitor to sites in the latter two, and the largest flocks yet reported for Uruguay, suggesting that substantial numbers use the country's open habitats in winter.

YELLOW-BREASTED CRAKE *Porzana flaviventer flaviventer*

At least two flushed in a shallow marsh surrounded by tall grassland, on 5 November 2000, at establecimiento Santo Domingo, *c*.25 km north-east of Quebracho, western dpto. Pasysandú (ABA). Just three previous records in Uruguay: one found dead at the río Cebollatí, near the town of Cebollatí, dpto. Rocha, May 1960 (Vaz-Ferreira & Gerzenstein 1961), whilst Arballo & Cravino (1999) referred to observations near Juan Lacaze, dpto. Colonia (undated), and Punta del Este, dpto. Maldonado (November 1994). Ours is the first record in northern Uruguay. No records in Entre Ríos, Argentina (de la Peña 1997), and just two in Rio Grande do Sul (Maurício & Dias 2000).

BLACKISH OYSTERCATCHER *Haematopus ater*

On 6 July 2005 one photographed at Cabo Polonio, dpto. Rocha (ABA), with a single in the same place on 19 September 2004, 23 August 2005, 8, 22, 30 January and 30 March 2006 (J.

C. Gambarotta *in litt*. 2006, C. Calimares *in litt*. 2006), all perhaps the same bird. American Oystercatcher *H. palliatus* was also present. *H. ater* was seen at Aguas Dulces, dpto. Rocha, in April 1995 (J. C. Gambarotta *in litt*. 2006), and also by C. Calimares (*in litt*. 2006) on 22 and 30 January and 30 March 2006. Previous records involve one, in February 1981, between Punta del Marco and Punta de Castillo, dpto. Rocha (Osorio 1981), and perhaps the same in August 1981 at arroyo Valizas (Escalante 1983), as these sites are within 2 km. Roballo Vargas & Amaro Padilla (2000) reported observations of singles at Punta del Este, dpto. Maldonado, in September 1999 and June 2000. Smith (1927) reported breeding on islands off La Coronilla, dpto. Rocha, which was questioned by Cuello & Gerzenstein (1962), whilst Gore & Gepp (1978) considered it a rare winter visitor. Apparently an occasional visitor which may remain relatively long periods. Occasional in coastal prov. Buenos Aires, Argentina (Narosky & Di Giacomo 1993).

WHIMBREL *Numenius phaeopus hudsonicus*

Singles at Laguna de Rocha, on 30 May 1997 (ABA), Chuy, 16 December 1990 (photographed by E. Gómez-Haedo; S. Claramunt *in litt*. 2006), Aguas Dulces, 19 October 1996 (C. Calimares *in litt*. 2006), Refugio de Fauna Laguna de Castillos, 11 April 2000 (J. C. Gambarotta *in litt*. 2006), all dpto. Rocha; arroyo Maldonado, *c*.5 km south of San Carlos, dpto. Maldonado, 22 October 1993 (T. Rabau *in litt*. 2006); Playa Carrasco, dpto. Montevideo, 3 April 2003 (F. García Olaso *in litt*. 2007); Solymar, dpto. Canelones, 11 October 2004 (C. Guadalupe pers. comm. 2004); and Punta Carretas, dpto. Montevideo, 4 November 2004 (D. Caballero *in litt*. 2007). An observation reported by M. Huertas lacks details (Huertas 1988). Not included by Gore & Gepp (1978) or Cuello (1985), the only published records were provided by Morrison & Ross (1989), who reported singles between Chuy and Punta del Barco and at Laguna de Rocha. Rare on Argentine coasts (Narosky & Yzurieta 2003) but small numbers in November–April in Rio Grande do Sul (Lara Resende & Leeuwenberg 1987).

LEAST SEEDSNIPE *Thinocorus rumicivorus rumicivorus*

On 17 July 1998, a male and two females were at Laguna de Rocha, dpto. Rocha (ABA). On 24 April 2004, one at Sierra de Caracoles, 20 km north of San Carlos, dpto. Maldonado (W. Cabrera *in litt*. 2006). Few records for Uruguay, including old ones for dptos. Canelones, Colonia and San José (Cuello & Gerzenstein 1962). Also observed in several consecutive years, from 1971, in dpto. Maldonado (Gore & Gepp 1978). A rare winter visitor (Gore & Gepp 1978, Azpiroz 2001).

PALE-VENTED PIGEON *Columba cayennensis sylvestris*

On 8 December 2006 three in the environs of Paso Centurión, dpto. Cerro Largo (ABA, JLM), of which one was closely observed, permitting all of the salient features to be seen. Two other records of singles: one collected by E. Gómez-Haedo on 6 August 1999 near Cololó, dpto. Soriano (MNHN 5839), the other seen on 19 May 2000 at Refugio de Fauna Laguna de Castillos, dpto. Rocha (J. C. Gambarotta *in litt*. 2006). One previous published report: a bird taken at Laguna del Diario, dpto. Maldonado, in February 1958 (Vaz-Ferreira & Gerzenstein 1961).

GREY-FRONTED DOVE *Leptotila rufaxilla reichenbachii*

Found on 15–17 October (JLM) and 8–10 December 2006 (ABA, JLM), in gallery forest along the Yaguarón, near Paso Paiva and Paso Centurión, dpto. Cerro Largo. Several were heard daily and tape-recorded. Apparently fairly common but significantly outnumbered by

White-tipped Dove *L. verreauxi*. Claramunt & Cuello (2004) included dpto. Cerro Largo within the species' range based on specimens in MNHN (S. Claramunt *in litt.* 2006). Very few previous detailed reports: singles taken in dpto. Paysandú (Cuello & Gerzenstein 1962), at Tambores, dpto. Tacuarembó, in April 1958, and arroyo La Invernada, dpto. Artigas, in February 1954 (Vaz-Ferreira & Gerzenstein 1962), with reports from the río Arapey, dpto. Salto, in June 1988, at Paso Almería, río Cebollatí, dpto. Lavalleja, in October 1988, and at the mouth of the río Cebollatí, dpto. Rocha, in June 1989 (Arballo 1990). As *L. rufaxilla* and the far commoner and more widespread *L. verreauxi* can be difficult to separate in the field (see Belton 1984), future reports should specify how *L. rufaxilla* is identified and, where possible, be accompanied by evidence (e.g. recordings). Our observations are the first for 15 years. Common resident in Rio Grande do Sul, but recorded only twice within 70–100 km of the Uruguayan border (Belton 1984, Maurício & Dias 2001).

BURROWING PARROT *Cyanoliseus patagonus patagonus*

On 29 July 1989, one was by a minor road just south of Libertad, dpto. San José (ABA). On 22 October 1990, two were at Punta Artilleros, dpto. Colonia (G. Geymonat *in litt.* 1994). On 22 January 1996, two were photographed at Punta Colorada, dpto. Maldonado (J. Abente *in litt.* 2006). On 14–15 April 2000, two were observed at Punta Gorda and Playa Carrasco respectively, dpto. Montevideo (S. Alvarez *in litt.* 2006), and a pair on 25–26 February 2005 in downtown Montevideo (J. C. Mazzulla *in litt.* 2006). The few records for Uruguay were summarised by Bucher & Rodríguez (1986), who considered it probably a rare and infrequent winter visitor to the south-west. Former winter visitor to north-east prov. Buenos Aires. Populations were thought to have declined in recent decades, but may be increasing again (Narosky & Di Giacomo 1993). Some observations reported here may have involved escapees, especially those in Montevideo city and those seen in summer.

YELLOW-BILLED CUCKOO *Coccyzus americanus americanus*

One in Montevideo's Botanical Garden, dpto. Montevideo, on 28 April 2002 (C. Calimares *in litt.* 2006); at least one on 10–22 February 2004 at arroyo Frasquito, Pando, dpto. Canelones (E. Méndez *in litt.* 2006); and a single on 3 December 2006 at Refugio de Fauna Laguna de Castillos, dpto. Rocha (J. C. Gambarotta *in litt.* 2006). Previously known from three specimens, taken in February 1921 near the río Negro, dpto. Río Negro (Wetmore 1926), in February 1960 at San Gregorio, near the río Uruguay, dpto. Artigas (Cuello & Gerzenstein 1962), and at arroyo de las Limetas, Martín Chico, *c.*7 km west of Conchillas, dpto. Colonia, on 25 March 1967 (J. Abente *in litt.* 1994), with a sight record in January 1975 at Balneario Solís, dpto. Maldonado (Gore & Gepp 1978). Scarce summer visitor to Rio Grande do Sul (Belton 1994) and northern Argentina (Narosky & Yzurieta 2003).

ASH-COLOURED CUCKOO *Coccyzus cinereus*

On 31 December 2004, one at a nest with a feathered chick, at Parque Rodó, dpto. Montevideo (ABA). The nest was at *c.*8 m in an exotic tree and was initially located on 7 December when two birds were nest building (G. Betarte *in litt.* 2006). They were filmed by J. C. Mazzulla and tape-recorded (JLM); also found there in 1994 (G. Geymonat *in litt.* 2006). Singles at Refugio de Fauna Laguna de Castillos, dpto. Rocha on 11 October 1992, 11 November 1996, 18 February 2003, 3 November 2004 and 30 October 2006, with a pair seen repeatedly in January–February 2005 (J. C. Gambarotta *in litt.* 2006). Singles also recorded elsewhere in dpto. Rocha: at Aguas Dulces on 15 December 1997, at Colonia Vacacional Don Bosco, Laguna Negra, on 27 October 2004 (J. C. Gambarotta *in litt.* 2006), around Cerro Picudo, San Miguel National Park, on 15 November 2003 (T. Rabau *in litt.* 2006), and at isla del Padre, in the río Cebollatí, on 4 December 1999 (C. Calimares *in litt.* 1999). Few published records for Uruguay (Azpiroz 2001). Sanborn (1929) found it at estancia Concordia, on the río Uruguay, south-west of Dolores, dpto. Soriano, in January 1927. Cuello & Gerzenstein (1962) reported three specimens taken in dptos. San José (January 1959), Treinta y Tres (December 1959) and Colonia (January 1960), and one was seen in Montevideo city in December 1966 (Gore & Gepp 1978). Given the numerous recent observations, it is probably more common than thought and is certainly a summer resident, as in Rio Grande do Sul (Maurício & Dias 2000).

SMOOTH-BILLED ANI *Crotophaga ani*

Observed in dpto. Paysandú as follows: 9 January and 25 March 1997 and 13 September 2005, at establecimiento Santo Domingo, *c.*25 km north-east of Quebracho (ABA); 19 December 1998, at Cañada Jacinta, 10 km south of Salto (T. Rabau *in litt.* 2006); with several records for dpto. Rocha: 25 November 1998, Laguna de Rocha (ABA); 30 November 1998 (photographed), Route 10 just north of Valizas (ABA); 30 November 2006 (photographed), Route 9, km 303, around Fortaleza de Santa Teresa (ABA); 18 November 2001, Laguna de Rocha (S. Alvarez *in litt.* 2006); and 14 May 2005, Refugio de Fauna Laguna de Castillos (J. C. Gambarotta *in litt.* 2006). A group of four seen repeatedly from March 1994 by the río Olimar, Treinta y Tres city (C. Prigioni *in litt.* 1999); five, on 10 April 2006, near the río Uruguay, north of Bella Unión, dpto. Artigas (JLM); one, on 27 November 2006, at Rincón de Zamora, just north of Paso Ramírez, dpto. Tacuarembó (ABA); singles observed repeatedly on 6 December 2002–4 January 2003 and 5 December 2003, at establecimiento La Goyavière, 3 km south-east of San Carlos, dpto. Maldonado (T. Rabau *in litt.* 2006); and one, on 15 April 2006, at Arenitas Blancas, Salto city, dpto. Salto (J. C. Mazzulla *in litt.* 2006). The only previous reports for Uruguay were from dptos. Soriano and Rivera pre-1960 (see Cuello & Gerzenstein 1962).

GREATER ANI *Crotophaga major*

Recorded daily (1–3) on 16–18 November 1994, with two on 5 November 1996, in gallery forest at estancia Cuaró, *c.*20 km north of Diego Lamas, dpto. Artigas (ABA); at least one in mid November (JLM) and on 20 December 2005 (ABA) in gallery forest near the río Arapey Chico, estancia Malacara, *c.*25 km north-west of Lavalleja, dpto. Salto, where also recorded in mid-April 1995 (L. Alfaro pers. comm.). On 11 April 2006 one close to the río Uruguay, *c.*8 km north of Bella Unión, dpto. Artigas (JLM). A juvenile was photographed at establecimiento La Goyavière, 3 km south-east of San Carlos, dpto. Maldonado, on 1 June 1995 (T. Rabau *in litt.* 2006). Known from three other localities in dpto. Artigas (see Cuello & Gerzenstein 1962), but rare in Uruguay (Gore & Gepp 1978, Azpiroz 2001), with almost all records in November–April (Cuello & Zorilla de San Martín 1960), and probably a summer resident. The juvenile in Maldonado was perhaps on post-breeding dispersal and had wandered outside its normal range. Other extralimital observations are from prov. Buenos Aires, La Pampa and La Rioja, Argentina (Canevari *et al.* 1991). Scarce summer resident in Rio Grande do Sul (Belton 1994), where probably declining (Bencke *et al.* 2003). Also migratory in at least parts of northern Argentina (Canevari *et al.* 1991).

COMMON POTOO *Nyctibius griseus griseus*

On 16 November 2004 it was recorded at Paso de las Piedras, río Arapey Grande, *c.*25 km north of Colonia Itapebí, dpto. Salto (JLM). At 22.00 h one responded to playback and was subsequently seen and tape-recorded. Another was heard simultaneously further away. An individual which first responded to playback was later seen and recorded on 21 March 2005, at the confluence of arroyo Cambará and the río Arapey Grande, *c.*40 km west of Masoller, dpto. Salto (JLM). Another observed on 14 November 2005 at estancia Malacara, dpto. Salto, was initially heard, then moved closer in response to playback. It was filmed by D. Presa and its voice recorded (JLM). The species was again observed there on 21–22 December 2005 (ABA). It was also recorded on 26 February (JLM), 15–16 October (JLM) and 8–10 December 2006 (both authors), at Paso Paiva, on the río Yaguarón, usually in response to playback. Previously known from dptos. Artigas, Salto and Cerro Largo (Cuello & Gerzenstein 1962, Belton 1994). Probably a widespread and relatively common summer resident in gallery forests of northern Uruguay. Also fairly common in Rio Grande do Sul, where apparently also a summer resident (Belton 1994), and a rare resident in Entre Ríos (de la Peña 1997).

PAURAQUE *Nyctidromus albicollis derbyanus*

On 23 February 1999, one at the río Yaguarón, 1.5 km south of Paso Centurión, dpto. Cerro Largo (ABA), and next day a male (MNHN 5920) was taken by C. Prigioni nearby. On 17 June 2006 an apparent *N. albicollis* was observed at dusk at Rincón de Paiva, south of Paso Centurión (ABA, JLM). On 15 October 2006 at Paso Paiva, two were seen and tape-recorded along the Yaguarón (JLM), and next evening one was heard in the same area, and it was heard and seen again on 8–10 December 2006 (ABA, JLM). The two sites lie 3 km apart. Though included in general lists of the birds of Uruguay, based on the 1999 observations (Azpiroz 2001, Claramunt & Cuello 2004), details had not previously been published. *N. a. derbyanus* ranges across central and south Brazil, north and east Bolivia, Paraguay and north-east Argentina, where apparently sedentary (Cleere & Nurney 1998). Infrequent in Argentina (Narosky & Yzurieta 2003), with no specific records for Entre Ríos (de la Peña 1997), and scarce in Rio Grande do Sul, with no records near the Uruguayan border (Belton 1994).

SWIFT *Streptoprocne* sp.

On 11 February 1995, 4–5 large swifts with the white collar diagnostic of *Streptoprocne* were seen over Treinta y Tres city (C. Prigioni *in litt.* 1999). Belton (1994) considered White-collared *S. zonaris* and Biscutate Swifts *S. biscutata* impossible to distinguish in the field under most conditions. As their range and status in southernmost Brazil are apparently similar, and they form mixed flocks (Belton 1994), those seen in Treinta y Tres must remain unidentified. In Uruguay, a specimen of *S. zonaris* was collected in 1934 in the environs of Montevideo city (Cuello & Gerzenstein 1962).

WHITE-FRONTED WOODPECKER *Melanerpes cactorum*

Recorded at establecimiento Los Cedros, *c.*20 km north-west of Young, dpto. Río Negro on 12 April 2002 (two, of which one was tape-recorded and filmed: JLM, D. Presa); 12–13 October 2002 (three, and two in old-growth Espinal woodland 2 km from Los Cedros: JLM); 28 June 2003 (at least two: ABA); 24 October 2003 (one: D. Presa). Also found repeatedly *c.*120 km to the north in dpto. Salto: on 1 October 2004 two (one photographed) at the Estación Regional of the Facultad de Agronomía, 5 km south-east of San Antonio; the pair was recorded frequently in October–November 2004, roosting in a hole *c.*4 m high in a large ornamental tree, and again in late September–October 2005 (ABA). Additionally, one (MNHN 4768) was taken by D. Mailhos at Paso de las Cadenas, arroyo Negro, dpto. Río Negro, in September 1992. It was seen entering a tree roost with five others (data on specimen label). On 21–22 October 1994, also observed at arroyo Cololó, estancia La Sirena, 35 km north-east of Mercedes, dpto. Soriano. Tremoleras (1920) included it for Uruguay but provided no specifics. By the 1960s there were still no specimens or observations (Cuello &

Gerzenstein 1962), and Gore & Gepp (1978) omitted the species. Scarce resident in Entre Ríos, with records in the west, north and south-east (de la Peña 1997).

YELLOW-BROWED WOODPECKER *Piculus aurulentus*
A male in gallery forest by the río Yaguarón near Paso Paiva, dpto. Cerro Largo, on 16 October 2006 (JLM, J. Abente, S. Álvarez), was tape-recorded in response to playback. Tremoleras (1920) mentioned *P. aurulentus* for dptos. Paysandú and Salto, but Cuello & Gerzenstein (1962) suggested a misidentification of *Veniliornis spilogaster*. The first confirmed record for Uruguay and the southernmost ever. Uncommon resident in Rio Grande do Sul, Brazil, mostly known from the north-east, with scattered records elsewhere (Belton 1994, Maurício & Dias 1998), the closest site (Cerro das Almas) being *c*.100 km north-east of Paso Paiva (Maurício & Dias 2001).

CREAM-BACKED WOODPECKER *Campephilus leucopogon*
On 23 March 1986 a pair was beside the río Arapey Chico at estancia Luis María (=Malacara), dpto. Salto, with a pair also there on 30 March 1988 (ABA), but not observed in April 1995 and November–December 2005. On 15 April 1992 a male observed and tape-recorded near the río Arapey at Paso de las Piedras, *c*.30 km north of Colonia Itapebí, dpto. Salto (ABA), and a female collected by J. Cabrera (MNHN 4767). On 28 March 1994 a male was foraging in the same area, but the species was not seen there in November 2005. Also recorded at Termas de Guaviyú, dpto. Paysandú and Termas del Arapey, dpto. Salto. At the former a pair was seen on 15 October 1993 (E. Méndez *in litt*. 2006). At the latter it was recorded repeatedly: 28 March 1994, a male along the río Arapey Grande; 23–24 October 1997, three (probably a pair and juvenile) in a plantation (mainly *Eucalyptus* and *Grevillea* spp.); 2 September 2002, one in the camping area; and 28 August–2 September 2006, female photographed (G. Acosta y Lara *in litt*. 2006). Two were filmed on 14 July 2006 at Parque del Lago, north of Salto city, dpto. Salto (E. Muñoz pers. comm.). Finally, a pair was photographed at Pinguiño, *c*.10 km north of Nuevo Berlín, dpto. Río Negro, on 10 February 2007 (N. Zaldúa *in litt*. 2007). Relatively few records for Uruguay. One, from southern dpto. Rio Negro, involved a specimen, shown to Aplin (1894), and taken at estancia Santa Florencia, with observations from dptos. Artigas (Cuello & Gerzenstein 1962) and Salto (Arballo 1990). Our observations include the first for Paysandú.

SCALLOPED WOODCREEPER *Lepidocolaptes falcinellus*
On 24 February 1999 and 8 December 2006 singles were seen in gallery forest beside the río Yaguarón, 1 km south of Paso Centurión (ABA). On 8–9 April 1999, one was heard at arroyo Sarandí, Sierra de Ríos, with another seen and tape-recorded there next day (ABA). On 24–29 January 2000, at Paso de Melo, on the Yaguarón, several were seen or heard (ABA) and two were collected (MNHN 5913–14). On 25–28 February 2006 it was heard or seen daily at Paso Paiva and nearby (JLM). Finally, one was observed on 8 December 2006 1 km south of Paso Centurión (both authors). All these records lie within less than 30 km, in dpto. Cerro Largo, where the species appears locally fairly common, albeit less so than Olivaceus Woodcreeper *Sittasomus griseicapillus*. During two trips in June and August 2006 to Paso Paiva and Paso Centurión, it was not recorded. Narrow-billed Woodcreeper *L. angustirostris*, which is fairly common in western Uruguay (Azpiroz 2001), does not inhabit this region. Though *L. falcinellus* was mentioned for Uruguay by Arballo & Cravino (1999), Azpiroz (2001) and Claramunt & Cuello (2004), no details were published. A common resident in Rio Grande do Sul, mainly in the north and east (Belton 1994), including the Serra do Sudeste, near the Uruguay border (Maurício & Dias 2001).

OLIVACEOUS WOODCREEPER *Sittasomus griseicapillus sylviellus*

Found at several sites in dpto. Cerro Largo. On 24 February 1999, near Paso Centurión, two were seen and their contact calls recorded, with two heard in the same area next day (ABA). On 26 February one was taken by C. Prigioni (MNHN 5923) and three tape-recorded in the vicinity (ABA). On 7–9 April 1999, several were recorded along arroyo Sarandí, in the Sierra de Ríos (ABA). Several were observed daily on 24–29 January 2000, at Paso de Melo, río Yaguarón (ABA). On 25–28 February 2006 several were heard or seen at Paso Paiva and environs (JLM). At this site, and near Paso Centurión, several seen or heard on 17–19 June (both authors), 26 August 2006 (JLM), 15–17 October (JLM) and 8–10 December 2006 (both authors). The only previous record for Uruguay was a specimen taken on 7 October 1997 at Paso Centurión (Claramunt 1998). The new data reveal that it inhabits the same general area as *L. falcinellus* in Uruguay, and is a fairly common resident. A common resident over much of Rio Grande do Sul (Belton 1994), including the Serra do Sudeste, near the Uruguayan border (Maurício & Dias 2001).

PALE-BREASTED SPINETAIL *Synallaxis albescens australis*

One heard, seen (JLM) and filmed (by D. Presa), on 13 October 2002, near establecimiento Los Cedros, *c*.20 km north-west of Young, dpto. Río Negro. Old-growth patches of Espinal woodland characterised the area (subsequently cleared). Another was heard and seen, on 15 November 2005, at estancia Malacara, río Arapey Chico, dpto. Salto (JLM), at the transition from grassland to open woodland. Previously known from only two localities in Uruguay: establecimiento El Espinillar, dpto. Salto, and Cuevas de San Antonio, just north of Salto city, dpto. Salto (Claramunt & Mazzulla 2002). At the latter site it was also recorded on 29 September 2002 and 27 December 2003 (J. C. Mazzulla *in litt.* 2006). The species was also found in 2002 and 2004 at Corralitos, just south of Salto (J. C. Mazzulla unpubl.), and on 3 January 2003 at Salto Grande dam, north of Salto (J. C. Mazzulla *in litt*. 2006). Our observations extend the known range in the country 150 km south and 75 km east. We follow Claramunt & Mazzulla (2002) in assigning our observations to *S. a. australis*. Scarce resident in Entre Ríos (de la Peña 1997) and rare in Rio Grande do Sul (Bencke *et al*. 2003).

STRAIGHT-BILLED REEDHAUNTER *Limnoctites rectirostris*

Recorded by ABA (unless otherwise stated) as follows: Playa Penino, dpto. San José (October–November 1988); Laguna José Ignacio (14 May, 3 June, 2 July 1994), and Laguna del Diario (October 1994), dpto. Maldonado; Sierra de Chafalote (December 1988–May 2001), Laguna de Castillos, Route 9, km 245 (December 2000), Bañado de los Indios, Route 14, km 487–488 (regular 1997–2001), Route 9, km 216 (8 October 1998), estero de Pelotas, near Laguna Merín (December 1998), the río Cebollatí, near Laguna Merín (9 December 1999), Bañado Tres Bocas, Route 15, km 148 (February and April 1996), *c*.8 km south-west of Cebollatí, dpto. Rocha (April 2005); Área Protegida Quebrada de los Cuervos, dpto. Treinta y Tres (June 2001); Paso Centurión (February 1999), environs of Cerro Guazunambí (June 2001), and Paso Paiva, dpto. Cerro Largo (February, June, August 2006; JLM); and Laguna del Cisne, dpto. Canelones (January 2006). Most observations involved pairs or singles, but several were seen in southern and eastern dpto. Rocha. Elsewhere in dpto. Maldonado, the species was recorded repeatedly in patches of *Eryngium* sp. at Cuchilla de Maldonado, *c*.5 km west of Laguna José Ignacio, in August 1999–November 2006 (T. Rabau *in litt*. 2006); at marshes along the arroyo Maldonado, in August 2003–February 2005 (T. Rabau *in litt*. 2006); and, on 22 September 2006, two (one of them nest building) were at Gruta de Salamanca, *c*.20 km north-east of Aiguá (G. Cortés *in litt*. 2006). Considered uncommon in *Eryngium pandanifolium* and marshy vegetation in the south and east of the country (Azpiroz 2001), amost all previous detailed records were pre-1978 (Escalante 1956, Cuello & Gerzenstein 1962, Gerzenstein & Achaval 1967, Gore & Gepp 1978), except those in January 1994 at estancia El Pororó, dpto. Lavalleja (Anon. 1998), in July 1999, at Área Protegida Quebrada de los Cuervos (Gambarotta & Calimares 2000) and in December 1999, in Sierra de Chafalote (Azpiroz 2003). Darwin found *Limnoctites* and Curve-billed Reedhaunter *Limnornis curvirostris* at the same localities in dpto. Maldonado in 1833 (Gould 1839). Olson *et al.* (2005), however, suggested that they do not occur in proximity. In fact, *Limnoctites* and *Limnornis* do occur together at several sites throughout Uruguay. At Playa Penino, dpto. San José, both have been recorded (*Limnornis* on 2 July and *Limnoctites* on 9 October and 2 November 1988; ABA), and both were seen on 20 April 1996 at Bañado Tres Bocas (ABA). At Bañados de los Indios, which was regularly surveyed by ABA in 1997–2001, both species were recorded simultaneously on 22 April 1998, 1 July and 29 October 1999. At Laguna del Cisne, both were seen on 11 January 2006, and both have bred (a *Limnornis* nest was found in late December 1994 and a juvenile *Limnoctites* in mid-January 2006; ABA). Additionally, the two species have also been found at a marsh *c.*1 km east of Route 10, km 264.5, dpto. Rocha (C. Calimares *in litt*. 2006), and at Bañados de Arazatí, dpto. San José (Gore & Gepp 1978). Thus, the available data support Darwin's assertion.

RED-EYED THORNBIRD *Phacellodomus* (*erythrophthalmus*) *ferrugineigula*
On 19 June 2006 two (one photographed) were observed in a riparian thicket (<6 m height) including several *Erythrina cristagalli* (Leguminosae), surrounded by marshy vegetation, especially *Eryngium pandanifolium* (Apiaceae), at Paso Paiva, dpto. Cerro Largo (both authors). Also there, two were seen on 25–28 August (JLM), 15–16 October (JLM) and 8 December 2006 (both authors). They were filmed by J. C. Mazzulla and their voices recorded. Freckle-breasted Thornbird *P. striaticollis*, common throughout Uruguay, was also observed. Additional published records involve recent observations at four localities in dpto. Rivera (Cravino & Claramunt 2007). Usually considered a race of *P. erythrophthalmus*, but differences in morphology, habitat preferences and voice suggest it merits specific status (Ridgely & Tudor 1994, Remsen 2003). Those reported here match descriptions of *ferrugineigula*. Uncommon (and probably resident) in south and east Rio Grande do Sul, but not recorded <50 km from the Uruguayan border (Belton 1994); ours are the southernmost records.

GREATER THORNBIRD *Phacellodomus ruber*
On 10 April 2006 a pair was seen and tape-recorded in woodland near the río Uruguay, just north of Bella Unión, dpto. Artigas (JLM). Next day a single was at Parque Municipal Los Pinos, *c.*8 km north-west of Bella Unión, near the confluence of the ríos Cuareim and Uruguay. Recently found in dpto. Artigas (Claramunt & Cuello 2004). In Entre Ríos, a scarce resident, mainly in the west (de la Peña 1997) and in Rio Grande do Sul an uncommon resident near the río Uruguay (Belton 1994).

RUFOUS GNATEATER *Conopophaga lineata vulgaris*
On 27 August 2006 one was seen near Paso Paiva, dpto. Cerro Largo (JLM); it was filmed, and later mist-netted and photographed (J. Aldabe & J. C. Mazzulla). Another was found on 9 December 2006, *c.*1 km south of Paso Centurión, in the same area (both authors). On 7 October 1997 several were found in gallery forest along the río Yaguarón at Paso Centurión on the Brazil–Uruguay border, including two on the Uruguayan side (Maurício & Dias 2000). Paso Paiva is *c.*3 km south of Paso Centurión. Detected relatively recently at localities in neighbouring Rio Grande do Sul, Brazil (Maurício & Dias 1998, 2001), the species is prob-

ably sedentary in the area, as at localities in southern Rio Grande do Sul where it appears uncommon or scarce (Maurício & Dias 1998).

OLIVACEOUS ELAENIA *Elaenia mesoleuca*
Tape-recorded as follows: on 7 January 1995, at estancia Don Horacio, Rincón de Vassoura, dpto. Tacuarembó (ABA); on 20–22 November 2003, at arroyo Gajo del Lunarejo, 15 km south-east of Masoller, dpto. Rivera (JLM); and on 8–9 December 2006, *c.*1 km south of Paso Centurión, dpto. Cerro Largo (ABA, JLM). Ours are the first documented records for Tacuarembó and Cerro Largo. Previously, a specimen taken in January 2000 at arroyo Gajo del Lunarejo, dpto. Rivera (Claramunt & Rocha 2001), whilst Claramunt & Cuello (2004) included dptos. Cerro Largo and Montevideo in the species' range. Our record from Paso Centurión is the southernmost ever.

HIGHLAND ELAENIA *Elaenia obscura sordida*
On 25–28 February (JLM), 18–19 June (both authors), 15–17 October (JLM) and 8–10 December 2006 (both authors), singles or pairs were observed around Paso Paiva and Paso Centurión, dpto. Cerro Largo. Birds were photographed (P. Rodríguez & L. Doño), filmed (D. Presa) and their voices recorded (JLM). Recently reported for Uruguay from Paso Centurión, and found repeatedly there in November 1997–April 1998 and October 1998–April 1999 (Rocha 2000). Because all these records were obtained in spring and summer, Rocha (2000) considered it probably a summer resident. Our late autumn records suggest year-round presence, and in Rio Grande do Sul it is considered an uncommon resident (Belton 1994).

CRESTED DORADITO *Pseudocolopteryx sclateri*
One seen, on 2 November 1988, by a coastal lagoon at Playa Pascual, dpto. San José (ABA, G. Acosta y Lara), with another on 13 December 1998, at estero de Pelotas, dpto. Rocha, and a pair with two fledglings photographed there next day (ABA). At establecimiento Santo Domingo, *c.*25 km north-east of Quebracho, dpto. Paysandú, singles on 3 November 2000 and 23 December 2005 (ABA). Two pairs seen on 14 November 2002 at Refugio de Fauna Laguna de Castillos, where it was also recorded regularly in late spring to summer 2005–06 (J. C. Gambarotta *in litt.* 2006). First reported for Uruguay by Huertas (1988), without details, and also seen at Bañados de India Muerta, dpto. Rocha, in 1997, at Playa Penino, in 1998, and at Laguna Merin, dpto. Cerro Largo, in 1997–99 (Rocha Sagrera 2000). Few records in (south-west and south-east) Rio Grande do Sul (Belton 1994) and rare in Entre Ríos (de la Peña 1997).

PEARLY-VENTED TODY-TYRANT *Hemitriccus margaritaceiventer margaritaceiventer*
On 11–12 April 2006 two were observed (one tape-recorded) in dpto. Artigas (JLM), at Parque Municipal Los Pinos, *c.*8 km north-west of Bella Unión, and just east of Bella Unión near the río Cuareim. Recorded in Uruguay recently (Lyons 1998), but no details published. A scarce resident in Entre Ríos (de la Peña 1997) and, although not recorded in Rio Grande do Sul, it very probably occurs on the Brazilian side of the Cuareim.

OCHRE-FACED TODY-FLYCATCHER *Todirostrum plumbeiceps plumbeiceps*
On 23–24 February 1999, at least 12 were seen and/or heard (two tape-recorded) in gallery forest beside the Yaguarón *c.*1.5 km south of Paso Centurión, dpto. Cerro Largo (ABA). On 18 June 2006 two were found *c.*1 km south of Paso Centurión and on the same day and 19 June, singles were heard beside the río Yaguarón at Paso Paiva (both authors). In the same

area, birds were found at different sites in gallery forest and nearby forest patches on 15–17 October 2006 (JLM), but not in late August and early December 2006. The only previous detailed report for Uruguay was of two, taken on 6 October 1997, at Paso Centurión (Claramunt 1998). A common resident in Rio Grande do Sul (Belton 1984) and Maurício & Dias (2001) found it at Vila Basílio (*c*.70 km from the border with Uruguay), but did not report it for the Brazilian side of Paso Centurión.

CHOCOLATE-VENTED TYRANT *Neoxolmis rufiventris*
Observed repeatedly by ABA in dpto. Salto: 27 June 2003 (at least ten), 6.5 km east of Arerunguá; 22 July 2004 (18 and eight), 16 March 2005 (one) and 15 and 18 July 2005 (*c*.30–50), estancia El Recreo, just west of Cerros de Vera; 17 March 2005 (one) and 28 May 2005 (*c*.30), estancia El Tapado; 21 March 2005 (one), 28 and 29 May 2005 (two and a flock of 12), estancia Los Venados. These three estancias are within a relatively small area near Arerunguá and Cerros de Vera. Additionally, a flock was observed on 23 May 1988 at estancia Pastorini (Route 6, km 160), *c*.30 km west of Gallinal, dpto. Florida (A. Carriquiry *in litt*. 2001), and a single on 2 October 1991 at Refugio de Fauna Laguna de Castillos, dpto. Rocha (J. C. Gambarotta *et al*. 1999). Most previous records of this winter visitor to Uruguay were pre-1975. Cuello & Gerzenstein (1962) mentioned specimens taken in April 1960 at Campo Militar, dpto. Canelones, and in March 1959 at arroyo Tala de Salsipuedes Chico, dpto. Tacuarembó. Three additional specimens, deposited in MNHN, were taken at the río San Salvador, Paso de las Tamberas, dpto. Soriano, in August 1967 and September and October 1970 (J. Cuello *in litt*. 2006). Gore & Gepp (1978) mentioned a flock of *c*.15 seen in April 1967 in dpto. Tacuarembó (no locality), one in May 1973 near Balneario Solís, dpto. Maldonado, and five in July 1974 between Young and Nuevo Berlín, dpto. Río Negro. The only other report in the last 30 years involved a flock of 24 near arroyo El Tapado in August 1997 (Venzal & Mazzulla 2000), in the same general area as our recent records, which confirm that it is a regular winter visitor to the Arerunguá/El Tapado region, the only such area in Uruguay. Our observations include the earliest autumn record (16 March 2005) and the largest flocks for the country.

BROWN-CRESTED FLYCATCHER *Myiarchus tyrannulus tyrannulus*
On 11 April 2006 one was seen and its calls recorded, in open forest near the río Uruguay, 6 km north of Bella Union, dpto. Artigas (JLM). *M. tyrannulus* is morphologically very similar to Swainson's *M. swainsoni* and Short-crested Flycatchers *M. ferox*; the former a fairly common and widespread summer resident in Uruguay (Azpiroz 2001) and the latter hypothesised to occur (Joseph 2004). Voices of both differ from *M. tyrannulus*, being best described as whistles, but also including *huit* notes, rolls and rasps for *M. swainsoni*, and hiccups and rattles for *M. ferox* (Belton 1985, Joseph 2004). In the case of *M. swainsoni*'s *huit* notes, these are alternated with whistles and other complex phrases in its dawn song. Alternatively, *huit* notes are the most conspicuous element of *M. tyrannulus*' repertoire. The *huit* notes recorded at Bella Unión were not part of a dawn song and match those of *M. t. tyrannulus* on Boesman (2006). The first report for Uruguay, but two other records in nearby areas: one taken at Barra do Quarai in 1928 and another seen in May 2001 in forest near the rio Cuareim; the only records for Rio Grande do Sul (Bencke *et al*. 2003). Fairly common in central and northern Argentina (Narosky & Yzurieta 2003). Subspecific assignment follows Belton (1985) and is also supported by vocal characters.

CHILEAN SWALLOW *Tachycineta meyeni*
At least two seen at close range at Barra de la Laguna de Rocha, dpto. Rocha, on 14 August 2000 (ABA). Unlike White-rumped Swallow *T. leucorrhoa*, *T. meyeni* lacks the white thin stripe on the forehead, present even in young *T. leucorrhoa* (Belton 1985). One was also seen at Refugio de Fauna Laguna de Castillos, dpto. Rocha, on 16 June 2006, with several *T. leucorrhoa* (C. Calimares *in litt.* 2006), and 15 were observed there at close range on 13 August 2006 and a few days later (J. C. Gambarotta *in litt.* 2006). The only detailed reports for Uruguay are those of Gore & Gepp (1978) for Balneario Solís, dpto. Maldonado (June 1970 and August 1974). Claramunt & Cuello (2004) included dpto. San José within its range based on specimens deposited at MNHN (S. Claramunt *in litt.* 2006). An uncommon winter visitor to Rio Grande do Sul (Belton 1994).

SOUTHERN MARTIN *Progne elegans*
A male near Punta Negra, dpto. Maldonado, on 31 December 2005 (ABA), where one was photographed feeding at least one feathered chick at a nest on a roof, on 13 January 2007 (ABA). Single males were observed in the outskirts of Pando on 11 December 1993 and at Bañados de Carrasco on 30 November 2000, both in dpto. Canelones (E. Méndez *in litt.* 2006). Observations in dpto. Montevideo in November and December 1959 and 1960 (Cuello & Gerzenstein 1962) were the only published records for the country. Tremoleras (1920) cited it for dptos. Montevideo, Canelones and San José, but without details. Aplin (1894) referred to observations in Trinidad, dpto. Flores, but these probably were of Grey-breasted Martin *P. chalybea*, based on the site and numbers reported; the latter is common throughout the country. The observations reported here are the first for 45 years and provide the first evidence of breeding.

OCHRE-BREASTED PIPIT *Anthus nattereri*
This globally threatened species was found at several sites in central and northern Uruguay (ABA). First recorded at estancia Los Venados, dpto. Salto, on 26 September (one) and 5 October 2004 (three, at two sites), October–November 2004 (several), 20–21 January 2005 (one, though more were probably present), 14 July 2005 (at least 15 performing display-flights), 2 October 2005 (several heard), and October–early December 2005 (many). Also recorded at nearby estancia El Recreo, just west of Cerros de Vera, on 19 October (two), 1 November (two) and 4 November 2004 (one), and October–early December 2005 (one). Not found at Los Venados and El Recreo in March and May 2005. In 2005 found just north-east of San Antonio, dpto. Salto, as follows: 20–22 September (two), 5 October (one singing near a nest), and in October several were observed at two sites *c.*2 km apart, but none in November. Found at two localities in dpto. Durazno in 2006: 21–22 December (2+) and 28 December (3+), *c.*10 km south of Picada de Oribe; 27 (one) and 28 December (two), around arroyo del Estado, *c.*15 north-east of La Paloma. *A. nattereri* occurs sympatrically with other *Anthus* at all these sites, but is easily distinguished vocally and non-vocal individuals (except juveniles) can be identified by the yellowish-ochre underparts and boldly streaked upperparts (Ridgely & Tudor 1989, Narosky & Yzurieta 2003; ABA pers. obs.). Several were photographed in all four areas and the voices of two were recorded, at estancia Los Venados and south of Picada de Oribe. Several nests at estancia Los Venados (October–November 2004–05) and near San Antonio (October 2005). The first records for Uruguay and a several hundred km southward range extension. Our data suggest that Uruguayan birds depart the nesting grounds for several months post-breeding. It is rare in Rio Grande do Sul (Belton 1994) and very scarce in north-east Argentina (Narosky & Yzurieta 2003).

GRASS WREN *Cistothorus platensis polyglottus*
One singing on 24–25 January 2005 at estancia Cerros del Tesoro, Chapicuy, dpto. Paysandú (ABA), where singles were also recorded on 25 March and 19 September 2005 (ABA). On 23 December 2005, an adult feeding a fledgling in a patch (>10 ha) of tall grass at establecimiento Santo Domingo, *c*.25 km north-east of Quebracho, dpto. Paysandú (ABA). Also found *c*.10 km south of Picada de Oribe, dpto. Durazno on 21 (one) and 28 (two) December 2006 (ABA). One at Área Protegida Quebrada de los Cuervos on 28 October 2004 (J. C. Gambarotta *in litt*. 2006) and one filmed in midsummer 2005, at establecimiento Don Siba, *c*.30 km north-east of Risso, Cuchilla del Perdido, dpto. Soriano (D. Presa pers. comm.). Chebataroff reported it from Sierra de Mahoma, dpto. San José, pre-1963, but thereafter considered his observation 'doubtful' as he was unable to relocate it on subsequent field trips to the area (Chebataroff 1963, Chebataroff & Gerzenstein 1965). Previously reported from Área Protegida Quebrada de los Cuervos, where seen on 8–9 July 1999 (Gambarotta & Calimares 2000, who refer to observations by J. Cravino in dpto. Tacuarembó, without details). The observation above represents the first breeding for Uruguay. Infrequent in Argentina (Narosky and Yzurieta 2003) and rare in Rio Grande do Sul (Belton 1994).

CINNAMON WARBLING FINCH *Poospiza ornata*
One photographed (both authors), on 16 April 2005, at Carrasco Norte, just west of Carrasco International Airport, dpto. Canelones, showed no obvious signs of captivity. Included in recent lists of Uruguayan birds (Arballo & Cravino 1999, Azpiroz 2001), with a mapped record for dpto. Colonia in Azpiroz (2001) based on information provided by J. Cravino (*in litt*. 2001). Given that the species is illegally traded, the possibility of these being escapees must be considered. In Buenos Aires regular in the south and occasional in winter over the rest of the province (Narosky & Di Giacomo 1993).

LESSER GRASS FINCH *Emberizoides ypiranganus*
Observed by ABA as follows. The first record for Uruguay involved one photographed and tape-recorded, on 30 March 1999, in tall grass with shrubs near arroyo Tierras Coloradas, establecimiento Santo Domingo, *c*.25 km north-east of Quebracho, dpto. Paysandú. Found at the same site on 22 December 2004. Also at Santo Domingo, in tall grass surrounding a marsh, one seen on 4 November 2000 and a pair at a nest on 15 September 2005. The nest had three eggs which hatched early next day. Photographs of adults, eggs and chicks were taken. On 23 December 2005 one was seen in the same area. Repeatedly recorded at estancia Cerros del Tesoro, near Chapicuy, also in dpto. Paysandú: on 25–26 November 2004 (several), 23 March 2005 (two), 18 September 2005 (two pairs), 2 November 2005 (one photographed), in patches of tall grassland between cropped fields and pastures. New records were also obtained in eastern Uruguay. Two (with C. Calimares) at Bañado de los Indios, dpto. Rocha, on 23 June 2001. On 16 and 19 June 2002 singles were at Área Protegida Quebrada de los Cuervos, dpto. Treinta y Tres (ABA). Also, one and two at Bañado de los Indios on 27 January and 13 February 2000, singles at Estación Biológica Potrerillo de Santa Teresa on 13 and 20 August 2002 (C. Calimares *in litt*. 2006), seen at Área Protegida Quebrada de los Cuervos, dpto. Treinta y Tres, on 25 October 2003 and 28 October 2004 (J. C. Gambarotta *in litt*. 2006), with one and two, on 28 December 2004 and 1 March 2005, at Corralitos, just south of Salto city, dpto. Salto (J. C. Mazzulla *in litt*. 2006). Readily separated from Wedge-tailed Grass Finch *E. herbicola* by voice and plumage (Tobias *et al*. 1997). Previous published records refer to a few at Área Protegida Quebrada de los Cuervos, on 5–9 July 1999 (Gambarotta & Calimares 2000). The new data indicate that it is relatively widespread in Uruguay. The lack of reports pre-1999 but numerous reports since suggest it

is a recent arrival. The only other site where it is confirmed to breed is Reserva El Bagual in eastern Formosa, Argentina, where active nests have been found from 7 October–25 March (Di Giacomo 2005). Our observations extend its known nesting period by *c*.1 month. Uncommon in Rio Grande do Sul (Belton 1994), but not reported for Entre Ríos (de la Peña 1997).

PURPLE-THROATED EUPHONIA *Euphonia chlorotica serrirostris*
A male at the río Uruguay, on the outskirts of Bella Unión, dpto. Artigas, on 10 April 2006 (JLM), was observed for 30 seconds before it flew. The bird's head and throat were dark overall, except the yellow forehead, and its calls (*bee..., bee...., bee*) matched those of a recording of *E. chlorotica* (Straneck 1990). Barattini (1945) added this species to Uruguay's avifauna but, like Arballo & Cravino (1999), provided no details. The only common *Euphonia* in Rio Grande do Sul, but not found near the Uruguayan border (Belton 1994, Maurício & Dias 2001). Its range in north-east Argentina includes southern Corrientes, adjacent to Bella Unión (Narosky & Yzurieta 2003).

CHESTNUT-BACKED TANAGER *Tangara preciosa*
On 29 March 1988 a pair was seen in forest beside the río Arapey Chico at estancia Luis María (=Malacara), dpto. Salto (ABA). Next day a male was in the same area. On 9 June 2005 a pair was at arroyo Guaviyú, establecimiento Santo Domingo, *c*.25 km north-east of Quebracho, dpto. Paysandú (ABA), with a male *c*.1 km distant, in gallery forest along arroyo Guaviyú, the following day. Fairly common in eastern Uruguay (Azpiroz 2001), but no specific reports from the west, and no detailed records from Entre Ríos, Argentina (de la Peña 1997).

AZURE JAY *Cyanocorax caeruleus*
On 24 February 1999 two were seen and tape-recorded near the río Yaguarón south of Paso Centurión, dpto. Cerro Largo (ABA). On 25 February two were heard along the Yaguarón, on the Brazilian border at Paso Paiva, 3 km south of the first site (ABA). Subsequently, singles were seen by both authors in June (south of Paso Centurión) and December 2006 (Paso Paiva). Reports of larger groups (Azpiroz 2001) were estimated from aural cues (i.e. unconfirmed), but the species was not detected in February, August and October 2006 (JLM), nor was it observed at Sierra de Ríos (April 1999) or Paso de Melo (January 2000), dpto. Cerro Largo (ABA). Flocks roam widely (Belton 1994), perhaps explaining the lack of further observations in this area. Resident in most of central and northern Rio Grande do Sul, but recorded just once close to the Yaguarón (Belton 1994).

Concluding remarks

We added three new species (*Piculus aurulentus*, *Myiarchus tyrannulus* and *Anthus nattereri*) to Uruguay's avifauna; provided evidence for year-round residency of *Crypturellus obsoletus*, *Sittasomus griseicapillus*, *Conopophaga lineata*, *Elaenia obscura*, *Todirostrum plumbeiceps* and *Cyanocorax caeruleus*; and the southernmost records for *Nyctidromus albicollis*, *Piculus aurulentus*, *Lepidocolaptes falcinellus*, *Phacellodomus erythrophthalmus*, *Elaenia mesoleuca* and *Anthus nattereri*. The Arerunguá and Centurión areas (Fig. 1) in northern and eastern Uruguay are particularly important for the conservation of two distinct bird communities. The former provides breeding habitat for the globally threatened *Anthus nattereri* and the regionally scarce *Neoxolmis rufiventris*, as well as for other uncommon or rare grassland specialists, e.g. Tawny-throated Dotterel *Oreopholus ruficollis* and Pampas Meadowlark *Sturnella* *defilippii* (Azpiroz 2005). Gallery forests within the latter region are inhabited by Atlantic Forest elements, some of them at their southernmost limits. Current efforts to expand the country's network of protected areas and to provide incentives for environmentally friendly land-use practices should view these areas as priorities, as their long-term conservation is highly desirable.

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Noteworthy records of birds from the Pantanal, Chiquitano dry forest and *Cerrado* of south-western Brazil

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South-western Brazil is a very important area for birds in South America, with more than 700 species recorded (Dubs 1992, Tubelis & Tomas 2003), a richness explained by the presence of several major vegetation types (Brown 1986). The Pantanal is one of the largest floodplains in the world, located in the upper rio Paraguay basin (Alho & Gonçalves 2005, Harris *et al.* 2005), and harbours an avifauna of more than 450 species (Tubelis & Tomas 2003), including 133 migrants (Nunes & Tomas 2004). The flora and fauna of the Pantanal possess biogeographical affinities with five South American ecosystems: Amazonia to the north; the *Cerrado* to the north, east and south; the Chiquitano dry forest to the west; the Chaco to the south-west; and the Atlantic Forest to the south-east (Brown 1986, Rizzini *et al.* 1991, Dubs 1992, Prado *et al.* 1992, Pott & Pott 1994, Rizzini 1997, Alho & Gonçalves 2005, Vasconcelos & Hoffmann 2006). The Chiquitano is the largest patch of well-preserved dry forest in the Neotropics (Parker *et al.* 1993). This region was formerly considered as transitional between the Gran Chaco and Amazonia regions, but was recently recognised as a distinctive vegetation type (Parker *et al.* 1993, Davis *et al.* 1997). The major part of the Chiquitano dry forest is in Bolivia, with only a very restricted area in extreme western Brazil (Olson & Dinerstein 1998, Vasconcelos & Hoffmann 2006, National Geographic Society 2007, WWF 2007). The *Cerrado* is by far the largest savanna formation in South America, being central in relation to other biomes in the continent (Rizzini 1997, Gottsberger & Silberbauer-Gottsberger 2006). It is distributed across much of central Brazil, but also reaches extreme north-east Paraguay and eastern Bolivia (Rizzini 1997, Gottsberger & Silberbauer-Gottsberger 2006). *Cerrado* also occurs on the summits of isolated massifs of pre-Cambriam origin (*morrarias* in Brazil / *serranías* in Bolivia) along the rio Paraguay and within the Chiquitano dry forest region (Dubs 1992, Bates *et al.* 1992, Parker *et al.* 1993, Pott *et al.* 2000). Here, we present new and noteworthy records of birds from the Pantanal, Chiquitano dry forest and *Cerrado* of south-west Brazil, and comment on conservation, geographic ranges, migration and hybridisation of some species.

Methods

Birds were identified in the field visually and by their vocalisations. Tape-recordings were made using Sony TCM-5000 EV and Panasonic RQ-L31 tape-recorders and Sennheiser ME-66 and ME-88 microphones. Copies of all vocalisations have been deposited at the Arquivo Sonoro Prof. Elias Coelho (ASEC), Departamento de Zoologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil. Specimens were collected using shotguns and mist-nets, and are deposited at the Coleção Ornitológica do Departamento de Zoologia da Universidade Federal de Minas Gerais (DZUFMG), Belo Horizonte, Minas Gerais, and Museu de Zoologia da Universidade de São Paulo (MZUSP), São Paulo, Brazil. Some were compared to those housed at the following institutions: American Museum of Natural History, New York (AMNH), Museu de Zoologia da Universidade de São Paulo, São Paulo (MZUSP), and Museu Paraense Emílio Goeldi, Belém (MPEG). Systematic order and nomenclature follow the Brazilian Ornithological Records Committee (Comitê Brasileiro de Registros Ornitológicos 2006).

Field work was conducted in Corumbá municipality, Mato Grosso do Sul, and in Pirizal, Nossa Senhora do Livramento municipality, and Fazenda Descalvados, Cáceres, these last in Mato Grosso. Sites at Corumbá were surveyed by MFV and DH on the following dates: 16–21 September 2005, 17–22 November 2005, 12–23 January 2006 and 13–18 May 2006. Sites at Pirizal were visited by LEL on 7–21 September 2005 and 7–13 February 2006. Several sites at and around Fazenda Descalvados were surveyed by LFS and FS on 1–9 September 2007. Field records were obtained at the localities detailed below. Coordinates were taken from GPS readings or obtained from online satellite images (http://earth.google.com).

Retiro Novo (16°22′S, 56°18′W), Nossa Senhora do Livramento municipality: a cattle ranch located in the Pantanal floodplain (elevation 125 m).

Moquém (16°23′S, 56°16′W), Nossa Senhora do Livramento municipality: abandoned pastures, semi-deciduous forests (locally known as *mata de cordilheira*), and seasonally flooded riparian forests along the right bank of the rio Piraim (125 m).

Fazenda Descalvados (16°43′S, 57°44′W), Cáceres municipality: a 19th-century farm on the right bank of the rio Paraguay, with Chiquitano dry forest, pastures, cultures, marshes and gallery forest (140 m).

Assentamento Taquaral (19°08′–19°10′S, 57°41′–57°44′W), Corumbá municipality: a settlement with many small properties, covered by pastures, cultures and fragments of Chiquitano dry forest (90–110 m).

Fazenda Vale do Ribeiro (19°11′–19°12′S, 57°40′–57°41′W), Corumbá municipality: a farm on the west slope of Morraria Tromba dos Macacos, covered mainly by Chiquitano dry forest (200–550 m).

Maciço do Urucum (Morro São Domingos) (19°12′S, 57°35′W), Corumbá municipality: a spectacular massif rising from the lowlands of the Pantanal. The slopes are covered by Chiquitano dry forest, whereas the summit vegetation comprises *Cerrado* and gallery forests (1,010 m).

Maciço do Urucum (west slope) (19°14′S, 57°38′W), Corumbá municipality: an area covered by Chiquitano dry forest (165–210 m).

Fazenda Figueirinha (19°15′–19°17′S, 57°39′–57°41′W), Corumbá municipality: a cattle ranch covered by Pantanal and Chiquitano dry forest (85–100 m).

Parque Municipal Piraputangas (19°16′S, 57°35′W), Corumbá municipality: a reserve on the south-west slope of Maciço do Urucum covered mainly by Chiquitano dry forest, with gallery forest along streams (130–230 m).

Sítio Limãozinho (19°17′S, 57°35′W), Corumbá municipality: an area close to Parque Municipal Piraputangas, covered by second-growth Chiquitano dry forest, pastures and agriculture (145 m).

Fazenda Monjolo (19°18′–19°20′S, 57°33′–57°35′W), Corumbá municipality: a farm south of Maciço do Urucum, covered mainly by Chiquitano dry forest, with small lakes and marshes (110–265 m).

Estação Albuquerque (19°26'S, 57°30'W), Corumbá municipality: a railway station with pastures and degraded areas of Pantanal wetland (85 m).

Species accounts

BARE-FACED CURASSOW *Crax fasciolata*

Despite being a common species known from many sites in the Brazilian Pantanal (Dubs 1992, del Hoyo 1994, Tubelis & Tomas 2003, Antas & Palo Jr 2004), *C. fasciolata* is rare in the Bolivian Chaco and Chiquitano dry forest (Parker *et al*. 1993, Brooks *et al*. 2005). Parker *et al*. (1993) did not find it in the region of Cerro Mutún, at the border between Bolivia and Brazil, south of Puerto Suárez. A female was photographed by J. A. Ribeiro in 2004 (precise date unknown) in a Chiquitano dry forest at Fazenda Vale do Ribeiro, just 19 km east of Cerro Mutún. During 30 days of intensive field work in the Chiquitano dry forest of Corumbá we failed to detect this curassow, but it is very common at Fazenda Descalvados, with 25+ birds during ten days of field work. Specimens taken at this locality (MZUSP 79216–17) agree with the widespread nominate race. The rarity of *C. fasciolata* in the Brazilian Chiquitano (and probably in adjacent Bolivia) is related to overhunting, as local people informed us that the species was more common in the past, but they still hunt it when they have the opportunity. Another recent record from the Corumbá region was presented by Mauro & Campos (2000). Clay & Oren (2006) recently suggested that the species should be considered Near Threatened due to the combination of hunting pressure and habitat loss. Like any large-bodied curassow, *C. fasciolata* is hunted in many places and also suffers from habitat destruction. However, nominate Bare-faced Curassow has the largest distribution of any curassow, being common at numerous sites within its range, especially in the Brazilian Pantanal. Also, new populations appear to have become established in protected areas such as Serra da Canastra National Park (Bruno *et al*. 2006). The conservation status of the nominate race deserves more objective monitoring, before listing this curassow as Near Threatened.

LEAST BITTTERN *Ixobrychus exilis*

Previously known in the Pantanal floodplain only from sight records along the Transpantaneira highway (Tubelis & Tomas 2003), though A. Whittaker (*fide* K. J. Zimmer *in litt*. 2007) has tape-recorded multiple individuals along the Transpantaneira whilst leading birding groups there during various May visits in 2002–06. Some of these birds were also photographed by group participants. The first specimen record for the Pantanal is an adult male (DZUFMG 5089), collected by LEL in a marsh at Retiro Novo on 16 September 2005. The specimen had enlarged testes (7 mm) and was shot after it flushed from amidst clumps of *Eichornia* sp. (Pontederiaceae), in the margins of a natural lake ('Bahia dos Coqueiros'). The species is very secretive, but apparently locally not uncommon. In three mornings of field work at this lake LEL flushed another two from aquatic vegetation. Similarly, A. Whittaker (*fide* K. J. Zimmer *in litt*. 2007) judges that the species is fairly common along the Transpantaneira, but is apparently much more vocal in May than at other seasons, making the species easily overlooked. At Fazenda Descalvados and neighbouring Estação Ecológica Taiamã the species is not rare, being vocal even during the hottest hours of the day, and several were heard or seen by LFS, FS and Marcelo Pádua. When attracted using playback, the birds usually did not fly towards the sound.

MISSISSIPPI KITE *Ictinia mississippiensis*

This raptor migrates from North America to Paraguay, Argentina and Bolivia (White 1994, Sick 1997, Baughman 2003). There are few records in Brazil: Anavilhanas, Amazonas (21

November 1985), Poconé municipality, Mato Grosso (February 1996), Chapada dos Guimarães, Mato Grosso (14 November 1996 and 14 October 1999), Transpantaneira highway, Mato Grosso (17 October 1997 and 12 October 1999), Fazenda Jatobá da Mata, Minas Gerais (10 January 2003), Tailândia, Pará (12 January 2006) and SESC Pantanal private reserve, Mato Grosso (in October, no specific date) (Stotz *et al.* 1992, Mazar Barnett *et al.* 1999, Mazar Barnett & Kirwan 2000a,b, Antas & Palo Jr 2004, Kirwan *et al.* 2004, Olmos *et al.* 2006). Whittaker *et al.* (in press) detail a number of additional records between 1996 and the present, amongst them a flock of 67 north of Aquidauana, Mato Grosso do Sul, on 17 October 2003. Videotape of this flock, by K. J. Zimmer, confirms the first record of Mississippi Kite for Mato Grosso do Sul, as well providing only the second physical evidence of the species for Brazil. On 17 January 2006, in the late afternoon (18.45 h), *c.*250 were observed by MFV flying over a Pantanal area at Fazenda Figueirinha, moving south-east to north-west. This appears to be the second record of *I. mississippiensis* for Mato Grosso do Sul.

BLACK-BANDED OWL *Strix huhula*

The first record for the Pantanal floodplain (Tubelis & Tomas 2003) is an adult male (DZUFMG 5030), with slightly enlarged testes (4 mm), collected by LEL at Moquém on 13 February 2006. It was taken in a disturbed gallery forest lining a small creek that discharges into the rio Piraim. This owl is poorly known, locally distributed across almost all of Brazil (Pinto 1978, Sick 1997, Gonzaga & Castiglioni 2004), but with only scattered records in adjacent Bolivia (Remsen & Traylor 1983) and Paraguay (Lowen *et al.* 1997).

BUFF-BELLIED HERMIT *Phaethornis subochraceus*

This species' known range is restricted to the Chiquitano dry forest and adjacent Pantanal (Vasconcelos & Hoffmann 2006), where it has been recorded from relatively few, sparsely distributed localities, and confirmed by very few specimens (Parker *et al.* 1993, Hinkelmann 1999). On 18 September 2005, a female (DZUFMG 4578) was collected by MFV and DH within a fragment of Chiquitano dry forest at Fazenda Monjolo. Another was observed by MFV, on 21 November 2005, taking insects from spiders' webs in a legume at the edge of a Chiquitano dry forest, at Parque Municipal Piraputangas. On 15 January 2006 one was observed by MFV chasing another individual in the same area. Collecting localities of *P. subochraceus* in Brazil are: Fazenda São João (AMNH 127387, locality written as 'San Juan Fazenda' on the specimen's label) and Descalvados (AMNH 149425, MZUSP 79290–91). Other Brazilian locality records unsupported by specimens include: Recanto Passárgada, Porto Limão, the Serra da Bodoquena region and along the Transpantaneira highway (Cintra & Yamashita 1990, Willis & Oniki 1990, Tubelis & Tomas 2003, Pivatto *et al.* 2006). A record in the literature of Scale-throated Hermit *Phaethornis eurynome* from the Corumbá region (Mauro & Campos 2000) could pertain to a misidentification of *P. subochraceus*. *P. eurynome*, normally associated with the Atlantic Forest, is unknown from the Chiquitano dry forest, and the few records from the south-eastern Pantanal lack corroborative specimens (Dubs 1992, Tubelis & Tomas 2003).

PICULET *Picumnus 'corumbanus'*

Lima (1920) described *Picumnus lepidotus corumbanus* based on a male from Corumbá collected in November 1917 by E. Garbe. The specimen (MZUSP 9902) has pale underparts with very fine brownish bars and a few scales on the breast and flanks. Subsequently, in August 1930, J. L. Lima collected five additional specimens of *'corumbanus'* at Miranda, Mato Grosso do Sul: a male (MZUSP 13150) and four females (MZUSP 13146–149). Plumage characters are not constant and these specimens show intermediate characters between *P.*

cirratus and *P. albosquamatus*, especially in the underparts. All of them present, to greater or lesser extent, the fine bars of the type, and scaly marks of *P. albosquamatus*, on the breast. Pinto (1978) considered *P. l. corumbanus* a synonym of *P. minutissimus albosquamatus*. During our field expeditions to the Chiquitano dry forest of Corumbá, two male *Picumnus* (DZUFMG 4582, 4780) were collected by MFV at Sítio Limãozinho, on 21 November 2005 and 15 January 2006, respectively. Additionally, six specimens—two males (DZUFMG 4747–48) and four females (DZUFMG 4749–52)—were taken by MFV and DH at Fazenda Monjolo on 18–21 January 2006. This series was compared directly to the six specimens of '*corumbanus*' in MZUSP. All were extremely variable in the underparts, showing the same patterns observed in the MZUSP specimens. Short (1982) had previously pointed to the frequent interbreeding of *P. cirratus* and *P. albosquamatus* in southernmost Mato Grosso. We suspect that all specimens of '*corumbanus*' held in MZUSP and DZUFMG are hybrids between the two species. If they are, this hybrid zone appears to have been stable for more than 70 years. Tissue samples were collected and molecular studies are recommended to understand the pattern of hybridisation by *Picumnus* at the ecotone between Chiquitano dry forest and Pantanal. Similarly variably-plumaged individuals were observed by MFV and DH at the following localities: Estação Albuquerque (18 November 2005), Fazenda Figueirinha (19 November 2005, 14 and 16 January 2006), Assentamento Taquaral (20 November 2005, 17 January 2006 and 16 May 2006), Fazenda Vale do Ribeiro (16 January 2006), and the west slope of Maciço do Urucum (15 May 2006). It is possible that the observations of *P. cirratus* by Parker *et al.* (1993) in the adjacent forests of Cerro Mutún also relate to these hybrids.

AMAZONIAN STREAKED ANTWREN *Myrmotherula multostriata*

Only recently elevated to specific status, *M. multostriata* reaches its southernmost limits in north-east dpto. Santa Cruz, Bolivia, in the rio Guaporé drainage (Isler *et al.* 1999). On 15 May 2006, a singing individual was tape-recorded by MFV at the edge of a second-growth Chiquitano dry forest on the west slope of Maciço do Urucum. The tape-recording was compared with those on Isler & Whitney (2002) and match the loudsongs of *M. multostriata* and the more northerly *M. surinamensis*, which are sister species (Isler *et al.* 1999). As the loudsongs of the two species are not diagnosably different (Isler *et al.* 1999, Zimmer & Isler 2003), our identification of the Maciço do Urucum bird as *multostriata*, as opposed to *surinamensis*, which is known only from north of the rio Amazonas, is based on geographic proximity. Nonetheless, this is an unexpected record of an Amazonian bird in Chiquitano dry forest, and extends the species' range more than 600 km to the south-east. Parker *et al.* (1993) also found some Amazonian taxa of birds and mammals at other localities in the Bolivian Chiquitano dry forest. This is the first record of *M. multostriata* in Mato Grosso do Sul and in the rio Paraguay basin. Given the range disjunction and the habitat discrepancy presented by this record (Zimmer & Isler 2003), it would be desirable to collect specimens from the forests of Maciço do Urucum and other localities in the Chiquitano dry forest, to evaluate possible geographical variation in the plumage of this southern population.

PALE-BELLIED TYRANT-MANAKIN *Neopelma pallescens*

Despite being common virtually across the entire *Cerrado*, with scattered records to southern Guyana (Robbins *et al.* 2004), eastern Bolivia (Bates & Parker 1998), the Amapá savannas (Silva *et al.* 1997), the rios Tapajós and Amazonas, in the Amazon (Pinto 1944), and coastal north-east Brazil (Pinto 1944, Pinto & Camargo 1961), the following is the first record for the Pantanal. On 9 February 2006, LEL collected an unsexed individual (DZUFMG 5097) in a *mata de landi*, a seasonally flooded thicket, at Retiro Novo. The species is apparently common in the area.

SUBTROPICAL DORADITO *Pseudocolopteryx acutipennis*
Recently recorded in Brazil in coastal Paraná (Bornschein & Reinert 1999, Bornschein 2001) and twice in July 2002 and again in June 2003, on a river island in Rondônia (Whittaker 2004). It is assumed that populations of *P. acutipennis* breeding in the Andes of Bolivia and Argentina migrate during the austral winter to the Chaco of north-west Argentina, Bolivia and Paraguay (Fjeldså & Krabbe 1990). Navas (2002) also presented data confirming that this species breeds in Argentina during spring and summer, including areas at low elevations. His observations suggest that *P. acutipennis* from Argentina can also migrate north during autumn and winter. On 17 September 2005, a male (DZUFMG 4573) was collected by MFV and DH in a marsh with grasses, *Typha domingensis* (Typhaceae) and *Ludwigia* sp. (Onagraceae) in the environs of a Chiquitano dry forest at Fazenda Monjolo. The specimen was compared to one in MZUSP and with photographs of the entire series housed in AMNH. On 16 May 2006, another was observed by MFV in a Pantanal area at Fazenda Figueirinha and, on 8 September 2007, LFS, FS and Marcelo Pádua observed a doradito with the characters of *acutipennis* at Fazenda Descalvados. These are the first published records of *P. acutipennis* for the Brazilian Pantanal (Tubelis & Tomas 2003, Nunes & Tomas 2004) and for Mato Grosso do Sul. It is possible that these birds belong to migrant populations from the south or from the Andes, as both these records were from between autumn and winter, outside the known breeding period of the species (Navas 2002, Bostwick 2004). The specimen, an adult (skull fully pneumatised), was not in breeding condition (testes 0.6 × 0.4 mm). The occurrence of *P. acutipennis* in the Corumbá region was expected, as the species is known from the adjacent Bolivian Chiquitano (Ridgely & Tudor 1994, Reichle *et al*. 2003).

PLAIN TYRANNULET *Inezia inornata*
This species, reported to be 'not well known in life' by Ridgely & Tudor (1994), is only known in the Pantanal from its extreme western and southern borders (Tubelis & Tomas 2003). It was tape-recorded at various points along the Transpantaneira by T. A. Parker as long ago as August 1991, and A. Whittaker and K. J. Zimmer (*in litt*. 2007) have tape-recorded multiple individuals near Pixaim during annual August and September visits in 1991–2006. G. M. Kirwan (*in litt*. 2007) recorded the species as late as October in the SESC Pantanal private reserve. It appears to be a fairly common austral migrant to this region, and is a regular member of mixed-species flocks of insectivores in gallery forest and adjacent scrubby borders during this period. An unsexed individual collected by LEL at Retiro Novo on 10 September 2005 (DZUFMG 5088) is the first specimen record for the northern Pantanal. The species was mist-netted in a *mata de cambará*, a seasonally flooded forest dominated by *Vochysia divergens* (Vochysiaceae). Additional specimens (two males) were collected by MFV at Fazenda Figuerinha on 19 November 2005 (DZUFMG 4581) and 16 January 2006 (DZUFMG 4755). Both were taken after being attracted by imitating the song of Ferruginous Pygmy-owl *Glaucidium brasilianum*. At Fazenda Descalvados, LFS and FS collected three (MZUSP 79346–48) in gallery forest beside the rio Paraguay, where the species is not rare, being easily located by its voice. Plain Tyrannulet is considered an austral migrant, also reaching the Cuiabá region and the states of Acre and Rondônia (Sick 1997), but records are in August–November/ December, including three taken at Urucum in late November 1913 (Naumburg 1930), suggesting that the species remains in Brazil longer than might be expected of a migrant.

ALDER FLYCATCHER *Empidonax alnorum*
Only two records of this North American migrant (Baughman 2003, Farnsworth & Lebbin 2004) are known for Brazil: a specimen from Santarém, Pará (24 February 1978), and the sighting of a singing bird at Manaus, Amazonas (15 December 1984) (Stotz *et al.* 1992, Ridgely & Tudor 1994, Sick 1997). On 19 November 2005 an unsexed individual (DZUFMG 4580) was collected by MFV in a Pantanal area at Fazenda Figueirinha, in the edge of dense *Parkinsonia aculeata* (Leguminosae) scrub close to a marsh. It was compared to that from Santarém, held in MPEG, and with photographs of the entire series at AMNH. This is the first record for *E. alnorum* in Mato Grosso do Sul and the Brazilian Pantanal (Tubelis & Tomas 2003, Nunes & Tomas 2004), and the third for Brazil. It was expected to occur in south-west Brazil as the species is known from nearby eastern dpto. Santa Cruz, Bolivia (Parker *et al.* 1993, Ridgely & Tudor 1994, Ayuso & Arambiza Segundo 2001, Reichle *et al.* 2003).

CLIFF SWALLOW *Petrochelidon pyrrhonota*
Known in the Pantanal only from a sight record along the Transpantaneira highway (Tubelis & Tomas 2003). A young female (DZUFMG 5102) found dead, by LEL, on 17 September 2005, at Retiro Novo, is the first documented record for the Pantanal floodplain. It apparently died after hitting a window. On the same day LEL also mist-netted a Barn Swallow *Hirundo rustica*. Cliff Swallow was only recently reported for Bolivia (Remsen & Traylor 1983).

WHITE-RUMPED TANAGER *Cypsnagra hirundinacea*
Known from sight records at the southern border of the Pantanal floodplain (Tubelis & Tomas 2003), thus the first documented record in the Pantanal wetland is of a female (DZUFMG 5067), collected by LEL, at Retiro Novo on 17 September 2005. It was associated with a mixed-species flock, from which Checkered Woodpecker *Picoides mixtus* (DZUFMG 5106), Campo Suiriri *Suiriri s. affinis* (DZUFMG 5126) and Black-throated Saltator *Saltator atricollis* (DZUFMG 5120) were also collected, in a wet savanna with forest islands on termite mounds (*campo de murundum*). All of these are common constituents of mixed-species flocks in the central Brazilian *Cerrado* (Alves & Cavalcanti 1996, Ragusa-Netto 2000, Lopes 2005), and apparently occur only at the borders of the Pantanal floodplain (Tubelis & Tomas 2003, Tubelis 2007).

BLUE FINCH *Porphyrospiza caerulescens*
This *Cerrado* endemic (Silva 1995a,b, 1997, Silva & Bates 2002) is known from few records at the western edge of its range (Naumburg 1930, Willis & Oniki 1990, Parker & Rocha 1991, Bates *et al.* 1992, Parker *et al.* 1993, Tubelis & Tomas 2003, Maillard & Catari 2004). On 18 November 2005, MFV collected a male (DZUFMG 4579) in a *campo sujo* atop Maciço do Urucum. The gizzard contained 80% dry seeds (45 seeds of grasses and two unidentified) and 20% arthropods (12 Lepidoptera larvae, five Coleoptera, one Formicidae and one Araneae). There is an old record of this species at the same site (Salvadori 1900 *in* Naumburg 1930). Parker *et al.* (1993) observed *P. caerulescens* on the summit of Cerro Mutún, just 29 km from Maciço do Urucum, but suspected that the closest populations would be further east, at Serra da Bodoquena, though the species was not found there in a detailed survey recently (Pivatto *et al.* 2006). These records demonstrate that island-like *cerrados* atop the 'morrarias' in the Pantanal and Chiquitano dry forest are important sites for the conservation of isolated populations of this Near-Threatened species (BirdLife International 2004).

DULL-COLOURED GRASSQUIT *Tiaris obscurus*

The first probable locality for this species in Brazil was Chapada dos Guimarães, Mato Grosso, where H. H. Smith collected two female grassquits, originally identified as *T. fuliginosus*, in August 1885 (Bates 1997). Bates (1997), after re-examining these specimens, suggested that they instead represented the first Brazilian records of *T. obscurus*. The species was subsequently observed by A. Whittaker near Cuiabá, Mato Grosso, on 16 September 2000; by Braulio Carlos near Poconé, Mato Grosso, on 8 March 2002; and again by Braulio Carlos at Chapada dos Guimarães, Mato Grosso, on 16 October 2002 (Whittaker & Carlos 2004). The first confirmed record for the country was of a bird found near Morro do Urucum, Mato Grosso do Sul, by K. J. Zimmer and A. Whittaker, and videotaped by Zimmer, on 13 October 2003 (Zimmer & Whittaker in press). On 19 September 2005 a specimen (DZUFMG 4745) was collected by MFV and DH in the same marsh where *P. acutipennis* was collected, at Fazenda Monjolo. It was compared to photographs of the series at AMNH. The specimen is an adult male (skull fully pneumatised; testes 1.0 × 0.5 mm) with a bicoloured bill (dark maxilla and pale pinkish-cream mandible), and is similar to a photograph of a bird trapped in Paraguay (Clay *et al.* 1998), as well as matching the description by Bates (1997) of the morph occurring in the eastern Andes south of dpto. La Paz to northern Argentina. This is the first specimen for Mato Grosso do Sul, though its occurrence is unsurprising, as the species is known from adjacent dpto. Santa Cruz, eastern Bolivia (Parker *et al.* 1993, Bates 1997, Ayuso & Arambiza Segundo 2001, Reichle *et al.* 2003, Brumfield *et al.* 2004). Another male (MZUSP 79424; skull fully pneumatised; testes 2 × 1 mm) was collected on 5 September 2007 by LFS and FS at Fazenda Descalvados. Migratory movements of this species in South America are still unknown, but all records in low-altitude sites east of the Andes were during the austral winter (Bates 1997, Capper *et al.* 2001). The small testes of our specimens and that they were collected in the austral winter suggest the birds were wintering in the Brazilian Chiquitano and Pantanal regions, *c.*700 km east of the Andes.

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A range extension for Curl-crested Araçari *Pteroglossus beauharnaesii*: implications for avian contact zones in southern Amazonia

by Alexander C. Lees & Carlos A. Peres

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The monotypic Curl-crested Araçari *Pteroglossus beauharnaesii* occurs south of the Amazon from northern Peru (south of the río Marañón) and western Brazil (north-east to the mouth of the rio Madeira and south-east in a narrow tongue to the headwaters of the upper rio Xingu), and south to northern and central Bolivia in Pando and Cochabamba (Short & Horne 2002). Recent molecular analyses place it within the Red-necked Araçari *P. bitorquatus* species-group (Eberhard & Bermingham 2005). ACL visited the Novo Progresso region, southern Pará, on 23–24 August 2006, to search for the enigmatic Golden-crowned Manakin *Lepidothrix vilasboasi*. At 11.15 h on 23 August an adult *P. beauharnaesii* was observed departing a tree cavity in moderately disturbed *terra firme* forest west of Novo Progresso at *c*.07°13′S, 55°32′W. The bird did not return within the next hour, perhaps indicating it was merely prospecting suitable nest sites. Subsequently that day, four *P. beauharnaesii* were located with a mixed-species foraging flock of five *P. bitorquatus reichenowi* and three Black-necked Araçaris *P. a. aracari* in *Cecropia* trees in the same area. ACL obtained digital images of one bird in poor light (Fig 1.). *P. beauharnaesii* was not recorded in this region by a recent survey (Pacheco & Olmos 2005), but the species is patchily distributed around Alta Floresta, northern Mato Grosso (Zimmer *et al*. 1997), and thus easily overlooked in rapid avifaunal surveys.

These records are the first of *P. beauharnaesii* in Pará north of the Serra do Cachimbo (a *Cerrado* region that serves as a fairly important faunal barrier to forest species), and a range extension of 260 km north-east from the nearest known site in southernmost Pará, at 09°27′S, 56°01′W (ACL pers. obs.). Haffer (1974, 1997) used the Ramphastidae as a key family to illustrate distributional patterns of parapatry in Amazonian birds. The distribution of *P. beauharnaesii* was used as an example to illustrate contact zones between birds in the Madeira–Tapajós interfluvium: 'The northern portion of the … interfluvium is inhabited by the Black-necked Aracari (*P. aracari*), which probably meets its southern representative [*Pteroglossus beauharnaesii*] in the same general area where the parrots *Pionopsitta vulturina*/*P. barrabandi*, as well as … several other species pairs, have established contact' (Haffer 1997). *P. a. aracari* occurs in several disjunct populations in north-central, east and south-east Brazil; in Amazonia, west to the rio Madeira, east to Maranhão and south to north-east to Mato Grosso and Goiás (Short & Horne 2002). Our record of *P. beauharnaesii* extends the area of known sympatry with *P. aracari* over a minimum 300 km-wide swathe of southern Amazonia either side of the Serra do Cachimbo in northern Mato Grosso and southern Pará, south as far as Alta Floresta and north at least to Novo Progresso. These species were formerly thought to occur sympatrically only in the southern Serra do Cachimbo (Haffer 1997).

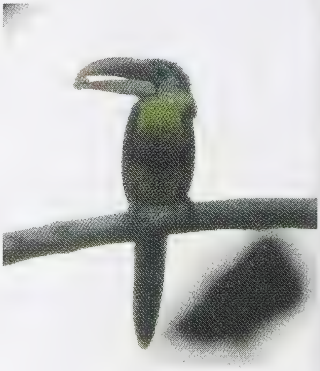

Figure 1. Curl-crested Aracari *Pteroglossus beauharnaesii*, near Novo Progresso, Pará, Brazil, 23 August 2006 (Alexander C. Lees)

Further complicating the distribution patterns hypothesised by Haffer is the recent description of Bald Parrot *Gypopsitta aurantiocephala* (Gaban-Lima *et al*. 2002), which has been found sympatrically with Orange-cheeked Parrot *G. barrabandi* at Alta Floresta (R. Hoyer pers. comm.) and with Vulturine Parrot *G. vulturina* on the middle Tapajós (Gaban-Lima *et al.* 2002). The range of *G. aurantiocephala* is still inadequately known but its preference for *campinarana* forest (Gaban-Lima *et al.* 2002) suggests it could occur sympatrically (but perhaps not syntopically) with either *G. barrabandi* or *G. vulturina* over a considerable area. The contact zones hypothesised by Haffer for the Madeira–Tapajós interfluvium appear to be not only much broader, but perhaps more complex than previously imagined, as evidenced by recent observations of *Pteroglossus* and *Gypopsitta*. These discoveries do not invalidate the importance of the rio Teles Pires region as a contact zone, but do illustrate the difficulty of determining where such zones lie and how much overlap exists between parapatric taxa given the dearth of basic presence/absence information for avian distributions in much of Amazonia.

Acknowledgements

The expedition to Novo Progresso was undertaken during the course of ACL's Ph.D. field work which was supported by a NERC studentship and a small grant from Conservation International. ACL thanks Geraldo Araújo for assistance in the field over this period. We thank Kevin Zimmer for his critical review of the manuscript.

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A substitute name for *Celeus lugubris castaneus* Olrog

by Rosendo Fraga & Edward C. Dickinson

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This woodpecker was named in 1963 from near Bato, on the río Negro, dpto. Beni, Bolivia. However *Picus castaneus* Wagler, 1829, now *Celeus castaneus* (Wagler, 1829) attached to a species from Central America, is a prior name and thus Olrog's secondary homonym requires substitution. In its place, we propose:

Celeus lugubris olrogi, nom. nov.

The new name honours Claës Olrog, a Swedish-born ornithologist of considerable importance in the development of Argentine ornithology. Vuilleumier (1995) wrote a recent tribute to his memory. The new subspecific name is a noun in the genitive case and was formed according to Art. 31.1.2 of ICZN (1999).

The type (no. 11902) in the Instituto Miguel Lillo, Tucumán, has been examined and photographed. It is a male and at first glance appears sufficiently different to warrant recognition. Olrog described it as distinct in colour, being chocolate-brown rather than the brownish black of the nominate or blackish like *C. l. kerri* Hargitt, 1891. Although Olrog had two specimens that he attributed to the more easterly *C. l. roosevelti* Cherrie, 1916, he mentioned no difference between these and his new form, except to state that the size of the new race differed from all others. Olrog had six Bolivian specimens that he attributed to this form, three each from Beni and Santa Cruz de la Sierra. Further study is required to confirm the distinctness of this population.

Acknowledgements

The discovery of this homonymy arose during work on Dickinson (2003) and we thank Norbert Bahr for sharing names proposed since Peters' *Check-list*. We are also grateful to A. Echevarría at the Instituto Miguel Lillo in Tucumán for access to specimens.

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A substitute name for *Turdus serranus unicolor* Olrog & Contino

by Rosendo Fraga & Edward C. Dickinson

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In 1970 Olrog and Contino gave the name *Turdus serranus unicolor* to an apparently new form of thrush, collected at 2,500 m near El Duraznillo, Alto Calilegua, dpto. Valle Grande, prov. Jujuy, Argentina. Unfortunately this name is unavailable as it is preoccupied by *Turdus unicolor* Tickell, 1833, from India. In its place we propose:

Turdus serranus continoi, nom. nov.

The new name honours Francisco Contino, an amateur ornithologist and bird illustrator from Jujuy, Argentina who wrote several ornithological papers, one in English, and a field guide to the birds of north-west Argentina. The new subspecific name is a noun in the genitive case and was formed according to Art. 31.1.2 of ICZN (1999).

The type (no. 13142) in the Instituto Miguel Lillo, Tucumán, has been examined and photographed. It is an adult female and the validity of the form is currently based on the female plumage, which is almost uniformly olivaceous brown, paler in the underparts. Adult females from nearby Bolivian and Peruvian populations have a marked reddish tinge, particularly in the underparts. Adult males from the type locality do not differ from males of other populations. The form breeds in montane Calilegua. This is known because a recently fledged chick was collected with the type female. Further comparison is required to determine whether the name should be placed in synonymy.

Acknowledgements

The discovery of this homonymy arose during work on Dickinson (2003) and we thank Norbert Bahr for sharing names proposed since Peters' *Check-list*. We are also grateful to A. Echevarría at the Instituto Miguel Lillo, Tucumán, for access to specimens.

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The name *Stipiturus malachurus polionotum* (Southern Emu-wren)—fixing of spelling

by Richard Schodde

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The subspecies of Southern Emu-wren *Stipiturus malachurus* in south-east South Australia was described by Schodde & Mason (1999: 102) and named *polionotum* in reference to its distinctive pale grey back. Due to a typographic error, the name was spelt two ways in the original description, the second spelling, *polionota*, occurring just once, in the explanation of the name on p. 103. Because the name was specified as a noun in apposition and based on the neuter Greek noun '*noton*' for back, it may be argued that the spelling *polionota* is an incorrect original spelling of the Latinised *polionotum*, a spelling used eight times in the work—see Art. 32.5 of the *International code of zoological nomenclature* (ICZN 1999). Even so, there is no direct or objective evidence for this, and to settle the matter, I hereby fix, as first reviser, *polionotum* as the correct original spelling under Art. 24.2 of the Code.

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Megalaiminae: the correct subfamily-group name for the Asian barbets

by Normand David

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Recently, Short & Horne (2002) used the family-group name Megalaimatinae for the Asian barbets, including the genus *Megalaima* Gray, 1842. Most likely, the spelling was taken from Olson (1991) who, whilst attributing the name to Megalaeminae of Sundevall (1873), stated that Megalaimatinae was grammatically correct, or from Bock (1994) who claimed that it is traceable to Megalaimatidae of Blyth (1852).

Blyth (1852) used Megalaimidae, and not Megalaimatidae, which was either an inadvertent mis-citation or an incorrect modification by Bock (1994); the stem aimat-, from the Greek αιμα [aima: blood], has nothing to do with the genus *Megalaima*. *Megalaima* Gray, 1842, ends in the Greek word λαιμς [laimos: throat], and was Latinised with a feminine ending. Accordingly, family-group names based on *Megalaima* must be formed using the stem megalaim- (ICZN 1999, Art. 29.3.2), just as Eurylaimidae is formed from *Eurylaimus* Horsfield, 1821, which also ends in the same Greek word but with a masculine Latinised terminus (see examples under Art. 30.1.3 of ICZN 1999). By using Megalaeminae (and *Megalaema* for *Megalaima*), Marshall & Marshall (1870) and Sundevall (1873) inserted puristic Latin spellings ('-laem-' for -laim-) that do not otherwise affect the formation of the family-group name.

Whereas Gray (1870) used Megalaiminae, Jerdon (1862), Stejneger *in* Kingsley (1885) and Sibley & Monroe (1990) used Megalaimidae. In the synonymy of his Capitonidae, Brodkorb (1971) attributed Megalaiminae [*sic*] to Sundevall (1873), and Megalaimidae to Stejneger *in* Kingsley (1885). Evidently, he had overlooked the above-mentioned prior uses of the name.

As shown, the incorrect spelling Megalaimatinae is far from being in prevailing usage (ICZN 1999, Art. 29.5). Therefore, the spelling Megalaiminae must be used as the subfamily-group name for the Asian barbets comprising *Megalaima* and relatives.

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Units of measurement, SI. Space between values and unit, e.g. 12.1 g

Statistical tests in the form: ($r_{28} = 3.12$, $P < 0.01$). ($?^2_3 = 7.31$, n.s.)

Citations to references in text: Author (Date); Author & Author (Date); if three or more authors—Author *et al.* (Date); or (Author(s) Date) etc.

References:

Author, A. (or Author, A. & Author, B.) Date. Title of paper. *Title of journal in italics.* Volume: pages.

Author, A. Date. *Title of book in italics.* Publisher, place of publication.

Author, A. Date. Title of paper/chapter. Pages *in* Editor, A. & Editor, B. (eds.) *Title of book/proceedings in italics.* Pages. Publisher, place of publication.

Address(es): addresses of authors, including e-mails if desired.

Format for tables (to be typed on separate sheets at end of paper):

TABLE n

Description of table contents, including any abbreviations

	Column A	Column B
Row 1	Data	Data
Row 2	Data	Data

Legends for figures to be typed on one sheet at end of paper, in the form: Figure n. Text of legend, including key to ymbols etc.

n a separate file (or on a separate sheet), authors should provide an abstract of no more then 150 words. This will be laced on the British Ornithologists' Club website.

orrespondence confirming acceptance of papers will be accompanied by a form on which authors must assign opyright of their paper to the British Ornithologists' Club. Authors may be charged for any corrections that they equest after their papers have been sent to the typesetter. After publication, authors will be sent, free of charge, a PDF le of their paper, which that can be used to prepare reprints.

Bulletin of the British Ornithologists' Club
ISSN 0007-1595
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Volume 128, Number 1, pages 1–72

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COMMITTEE
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S. A. H. Statham (*Hon. Secretary*) (2004)
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Bulletin of the British Ornithologists' Club

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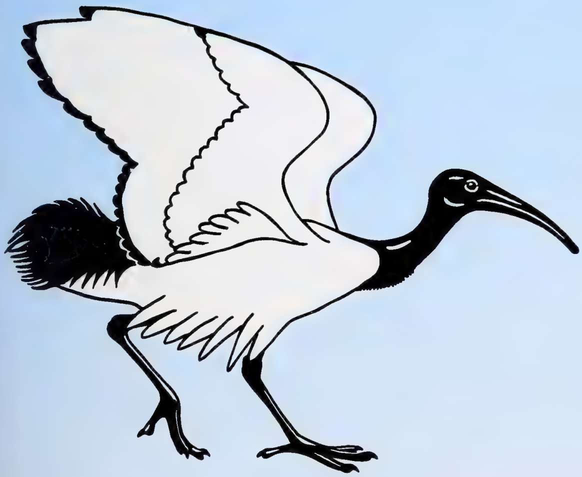

Volume 128 No. 2
June 2008

MEETINGS are normally held in the **Sherfield Building** of **Imperial College**, South Kensington, London SW7. The nearest Tube station is at South Kensington; a map of the area will be sent to members, on request. (Limited car parking facilities can be reserved [at a special reduced charge of **£5.00**], on prior application to the Hon. Secretary.)

The cash bar is open from **6.15 pm**, and a buffet supper, of two courses followed by coffee, is served at **7.00 pm.** (A vegetarian menu can be arranged if ordered at the time of booking.) Informal talks are given on completion, commencing at about 8.00 pm.

Dinner charges are **£22.50** per person.

FORTHCOMING MEETINGS

See also BOC website: **http://www.boc-online.org**

The venue for evening meetings for the remainder of 2008 (July, September and November) will revert to the ante-room on the ground floor of the Sherfield Building, Imperial College, South Kensington.

21 June (Saturday from 10:00 am)—a special extra meeting at Tring Museum. During the visit, the Revd. Tom Gladwin will talk about the naturalist Alfred Russel Wallace (1823–1913) and attendees will also have an opportunity to look at some specimens and behind the scenes activities of the Bird Group.

Applications to Hon. Secretary (address below) by **31 May 2008**

8 July—Dr Jo Cooper—*Fancy that: pigeons, finches, chickens and the Origin of Species*. One hundred and fifty years ago papers on natural selection by Darwin and Wallace were read at a Linnaean Society meeting in London and the world changed. Ornithology played a crucial role in the work of both men but in very different ways; Wallace explored a far-flung archipelago, while Darwin kept pigeons at home. In this talk, Jo Cooper will discuss the birds that inspired Darwin and show how his high-flying ideas possessed very humble foundations.

Applications to Hon. Secretary (address below) by **24 June 2008**

23 September—speaker to be confirmed
4 November—Richard Price—*Birds of Morocco* **(note that this talk has been moved from September to November)**

Overseas Members visiting Britain are especially welcome at these meetings, and the *Hon. Secretary* would be very pleased to hear from anyone who can offer to talk to the Club giving as much advance notice as possible—please contact: S. A. H. (Tony) Statham, Ashlyns Lodge, Chesham Road, Berkhamsted, Herts. HP4 2ST, UK. Tel. +44 (0)1442 876995 (or e-mail: boc.sec@bou.org.uk).

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Bulletin of the BRITISH ORNITHOLOGISTS' CLUB

Vol. 128 No. 2 Published 13 June 2008

CLUB ANNOUNCEMENTS

The committee welcomes the following new member who has recently joined the Club: Mr G. Fanghaenel (Germany). It is with regret that the death of the following member is reported: Prof. George A. Hall (USA) (1978).

Members are reminded that subscriptions for 2008 were due on 1 January and are kindly asked to check that any standing orders with their banks are recorded at the correct amount (£20 per annum). Regrettably several members are still paying incorrect subscription rates, which cause the Club unnecessary time and expense in administration duties.

The 949th meeting of the Club was held on Tuesday 11 March 2008, in the Rector's Residence at 170 Queen's Gate, Imperial College, London. Twenty-one members and eight guests were present.

Members attending were: Cdr. M. B. CASEMENT RN (*Chairman*), Miss H. BAKER, P. J. BELMAN, Dr J. H. COOPER, E. C. DICKINSON, T. M. DONEGAN, F. M. GAUNTLETT, D. GRIFFIN, K. HERON, Dr J. P. HUME, Dr C. F. MANN, B. S. MEADOWS, D. J. MONTIER, P. J. OLIVER, R. J. PRYTHERCH, N. J. REDMAN, J. M. REED, P. J. SELLAR, S. A. H. STATHAM, Dr L. SVENSSON (*Speaker*) and C. E. WHEELER.

Guests attending were: B. O'BRIEN, Mrs C. R. CASEMENT, Mrs M. H. GAUNTLETT, Mrs J. A. JONES, Mrs M. MONTIER, Mrs M. OLIVER, D. T. PARKIN and C. E. WHEELER.

After dinner, Dr Lars Svensson from Sweden gave a talk on *Warblers in the Caucasus*, picking out four species of particular interest for a taxonomist, based on a field trip in June 2007 to Georgia and Armenia, in the company of José Luis Copete and David Bigas. Illustrated by photographs of trapped birds and museum specimens for comparison, Svensson dealt first with the Green Warbler *Phylloscopus nitidus* and the question whether it merits being a separate species. It proved to be invariably morphologically distinct (in contrast to earlier statements in the literature), with a taxon-specific element in most songs, and clearly deserves to be split from the allopatric Greenish Warbler *P. trochiloides* complex, a path which will soon be recommended also by the Taxonomic Sub-Committee of the BOURC.

Next, the local Lesser Whitethroat *Sylvia curruca* was brought up, posing the question which subspecies breeds in the area. The described race *caucasica* seemed subtle though valid, being slightly greyer on the upperparts than the European nominate, although their songs do not differ. The question whether *caucasica* constitutes a link to the Central Asian montane form Hume's Lesser Whitethroat (*althaea*) requires further work, in particular in Iran.

The third warbler studied was Mountain Chiffchaff *P. sindianus lorenzii*. All those encountered had yellow on the underwing and nearly all have faint traces of yellowish-green on the scapulars and upperwing-coverts, at odds with statements in the literature (including by the speaker!). Svensson also stated his view that the Mountain Chiffchaff is sufficiently distinct in morphology and vocalisations to be treated separate from the 'Sind Mountain Chiffchaff' *P. s. sindianus*, thus would become monotypic 'Caucasian Mountain Chiffchaff' *P. lorenzii*.

Finally, the Common Chiffchaff in the Caucasus and Transcaucasia was discussed. Traditionally, these have been included in the subspecies *abietinus*, but breeders in west Turkey have been named as *brevirostris*, and it is unclear how far east this race occurs. Recently, the Caucasian and Transcaucasian birds have been described as *caucasicus*. However, with the exception of two specimens taken on the northern slopes of the Caucasus, none seen in Georgia and Armenia differs sufficiently from *abietinus* to warrant separation. The northern side of the Caucasus remains to be better investigated. The race *brevirostris* is believed to be a synonym of nominate *collybita*, and birds in east Turkey might represent a zone of integradation between this and *abietinus*.

ANNUAL GENERAL MEETING 2008

1. The Annual General Meeting of the British Ornithologists' Club was held in the Sherfield Building, Imperial College, London, SW7, on Tuesday 29 April 2008 at 6 pm with Cdr. M. B. Casement OBE RN in the Chair. Seventeen members were present (including nine from the committee and one ex-officio). Apologies were received from S. P. Dudley. The Minutes of the 2007 AGM held on 24 April 2007, which had been published (*Bull. Brit. Orn. Cl.* 127: 86–88), were approved and signed by the Chairman.

2. Chairman's report. This is my third report as your Chairman but, as in previous years, I propose to be brief because most points already appear in the Trustees' Annual Report, and will be covered in more detail by David Montier and Tony Statham under the appropriate items to follow. My thanks are due to them for their key roles in managing our affairs. Unfortunately, Guy Kirwan (*Hon. Editor*) is unable to be with us today. Sadly, your Committee says goodbye to Julian Hume on completion of his four-year term of office; despite his many overseas travel commitments, he has managed to attend most of our meetings, and we have greatly valued his support.

Behind the scenes, our continuing thanks are due to Steve Dudley who manages the membership and subscriptions. The steady and continuing small decline in membership remains a matter of concern, but is similar to other comparable societies. I am grateful to David Fisher who, together with Eng-Li Green, has achieved a major face-lift to update the website. If you haven't looked at it recently, I urge you to do so.

As you will see, our financial affairs are very healthy, despite major fluctuations in the stock market, largely thanks to the expert management of our Hon. Treasurer and our Trustees. We held six evening meetings, on a wide range of subjects, and a similar programme of six meetings is planned for 2008, with an additional meeting at Tring on Saturday 21 June. Thanks are due to Imperial College for their excellent administrative support and, despite the annual rise in dinner charges, for continuing to allow us very favourable rates. The Club's projector has seen good use throughout the year, and we thank Pat Sellar and Ron Kettle for their technical skills with the sound equipment.

The BOC–BOU Joint Publications Committee (JPC), under the chairmanship of Tom Gladwin, has made good progress. There were delays in two publications in the *Checklist* series, but *The birds of Borneo* and *The birds of Barbados* are expected to be published in summer and autumn 2008, and, hopefully, *The checklist of the birds of Britain and Ireland* will also be published in late 2008.

Two major projects have featured prominently in your Committee's discussions, and we have agreed to provide a grant towards completing the international Taxonomic Reference project (REFTAX). We have also agreed to finance, for a trial period of two years, the continuing publication of *Systematic Notes on Asian Birds* (SNAB), within the *Occasional Publications*. We thank Bob Cheke for his contribution as Commissioning Editor for the *Checklist* series.

Finally, I am grateful to Nigel Collar, as Chairman of the Bulletin Subcommittee (BSC), for his advice and support to Guy Kirwan, as Editor of the Bulletin; as you will have seen the first issue in the enlarged format, and with a re-designed cover, appeared in March.

3. Trustees Annual Report. The Chairman advised the meeting that the Trustees' Annual Report and Annual Accounts were again combined in the handout available at the meeting and confirmed that these would be published in the June issue of the Bulletin. The Hon. Treasurer drew attention to the income and expenditure details, and summarised the balance sheet. The Chairman thanked the Hon. Treasurer for his support and seconded his proposal that the accounts should be formally accepted; all those present agreed.

4. The Bulletin. In the absence of the *Hon. Editor*, the Chairman referred to his report published in the Trustees' Annual Report, which read as follows: 'Vol. 127 comprised 348 pages, a recent record, in part due to the re-inclusion of the annual index within the main pages of the Bulletin. Thirty-two papers of broad geographical scope were published, albeit with the Neotropics particularly well represented. A new species of brush finch (*Atlapetes*) from Colombia was described in the December issue, and taxonomy and nomenclature remain Bulletin mainstays. In this respect the recently announced close working cooperation between the *Hon. Editor* and the Standing Committee on Ornithological Nomenclature (SCON) is especially welcome (*Bull. Brit. Orn. Cl.* 127: 254). For papers published in 2007, the interval between receipt and publication was 4–16 months, with a mean of *c*.12 months. The Bulletin received a total of 51 new manuscripts in 2007. Of these, 11 were rejected and the remainder have been accepted or are still being refereed for potential publication. An Editorial Board was formed at the start of the year and its membership appears on the back cover of each issue. In the final throes of 2007, the *Hon. Editor*, the designer, Eng-Li Green, and Steven Gregory, who joined the Bulletin Subcommittee early in the year, were engaged in a bout of activity to revamp the Bulletin in time for the March 2008 issue evolving to a B5 format. Grateful thanks are due, as ever, to referees who have given freely of their time and expertise, to Eng-Li Green, of Alcedo Publishing, for her constant dedication to Bulletin duties, including production of the index, and Latimer Trend (printers) for their efficiency. Tony Statham prepared the cover information and Club Announcements, whilst staff at The Natural History Museum, Tring, continue to offer much-needed assistance in all manner of small but useful ways.'

5. Publications report. The Chairman of the BOU–BOC Joint Publications Committee referred to his report published in the Trustees Annual Report, which can be found on p. 77 of this issue.

6. Election of Officers and Committee. The Chairman said that the election of Officers was as proposed in the agenda as published in *Bull. Brit. Orn. Cl.* 128: 1:

Mr S. A. H. Statham be re-elected as *Hon. Secretary.*
Mr D. J. Montier be re-elected as *Hon. Treasurer.*

BRITISH ORNITHOLOGISTS' CLUB

Dinner Meetings – July - November 2008

BOOKING FORM

Because arrangements for meetings have to be made with Imperial College well in advance, Members are asked to send bookings **14 days beforehand**. If you book and subsequently find you are unable to attend, please notify the **Hon. Secretary** as soon as possible. If the booking is cancelled less than 5 days before a meeting, the payment will not normally be refunded, unless the booking can be offered to another member. (Late applications can usually be taken up to am. on the Friday preceding a meeting). Vegetarian meals can be provided - please make your request at the time of booking. **Limited car parking** (at a special charge of £5.00 - this is no longer free), can be arranged on prior application to the ***Hon. Secretary***, giving details of car registration.

Have you recently looked at our website - **http://www.boc-online.org**?

✂--

Tuesday 4th November – Richard Price – "Birds of Morocco"

I wish to attend with ....guests. Name(s) of my guest(s)............................. ....

My cheque for .... (**£22.50** per head) is enclosed.

Name...Tel..................

➡ Please return (or e-mail) to: The **Hon. Secretary BOC,** (Tony Statham), Ashlyns Lodge, Chesham Road , Berkhamsted, Herts. HP4 2ST. Tel: 01442-876995 **by Tuesday 21st October**

✂--

Tuesday 23rd September – speaker still to be announced

✂--

Tuesday 8th July – Dr Jo Cooper – "Fancy that: pigeons, finches, chickens and the *Origin of Species*". In this talk, Jo Cooper will discuss the birds that inspired Darwin and show how his high-flying ideas had some very humble foundations.

I wish to attend with ....guests. Name(s) of my guest(s)............................. ....

My cheque for .... (**£22.50** per head) is enclosed.

Name...Tel..................

➡ Please return (or e-mail) to: The **Hon. Secretary BOC,** (Tony Statham), Ashlyns Lodge, Chesham Road, Berkhamsted, Herts. HP4 2ST. Tel: 01442-876995 **by Tuesday 24th June**

✂--

NB Spaces are still available for the talk and tour at Tring Museum from 10:00 am Saturday 21st June. Call the Hon. Secretary (01442 876995) if you wish to attend and have not already booked.

were received from S. P. Dudley. The Minutes of the 2007 AGM held on 24 April 2007, which had been published (*Bull. Brit. Orn. Cl.* 127: 86–88), were approved and signed by the Chairman.

2. Chairman's report. This is my third report as your Chairman but, as in previous years, I propose to be brief
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6. Election of Officers and Committee. The Chairman said that the election of Officers was as proposed in the agenda as published in *Bull. Brit. Orn. Cl.* 128: 1:

Mr S. A. H. Statham be re-elected as *Hon. Secretary.*
Mr D. J. Montier be re-elected as *Hon. Treasurer.*

One appointment to committee to be made (*vice* Dr J. P. Hume) from the following nomination:
M. J. Walton

No other changes to the committee were proposed, as all other members were eligible to serve at least one more year in office. All changes were proposed by the *Chairman* and seconded by Miss H. Baker.

The following *ex-officio members* were confirmed in continuation:

Revd. T. W. Gladwin (*Chairman Joint Publications Committee*)
Prof. R. A. Cheke (*Hon. Publications Officer*)
S. P. Dudley (Administration Manager)
G. M. Kirwan (*Hon. Editor*)

It was proposed and unanimously agreed that D. J. Fisher take over responsibility as *Hon. Website Manager.*

7. Any Other Business. The Chairman stated 'I would like to draw attention to all that this will be my last year as Chairman. I shall be standing down at the next AGM, having completed four years, as in our constitution, and I look to others to be actively seeking my successor. There can be no question of extending my term; apart from one brief break (1994–96), I will then have served on your Committee, for the past 19 years, so it is in the best interests of the Club for a change. I also qualify for a free TV licence and I look forward to a break'. There was no other business and the meeting closed at 6.20 pm.

BRITISH ORNITHOLOGISTS' CLUB

Founded 5 October 1892
Registered Charity No. 279583

TRUSTEES'ANNUAL REPORT FOR 2007

List of Trustees—Committee

Cdr. M. B. CASEMENT, OBE RN *Chairman* (2005)
Miss H. BAKER *Vice-Chairman* (2005)
S. A. H. STATHAM *Hon. Secretary* (2004)
D. J. MONTIER *Hon. Treasurer* (1997)
Dr. J. H. COOPER (2005)
D. J. FISHER (2007)
Dr. J. P. HUME (2004)
Dr. R. P. PRŶS-JONES (2007)
P. J. WILKINSON (2005)

Correspondence and enquiries to the *Hon. Secretary*, Ashlyns Lodge, Chesham Road, Berkhamsted, Herts. HP4 2ST

Hon. Editor G. M. Kirwan

Independent Examiners Porritt Rainey, 9 Pembroke Road, Sevenoaks, Kent TN13 1XR

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Constitution

The British Ornithologists' Club was founded in October 1892. It currently operates under Rules revised in 2000 and approved at a Special General Meeting on 31 October of that year. Members of the Committee, who are also the Trustees of the Club, are listed above with the dates of their appointment. The Committee is responsible for the general control and management of the Club and consists of four officers—a *Chairman* and *Vice-Chairman*, each elected for four years, an *Hon. Secretary* and *Hon. Treasurer*, each elected for one year and eligible for re-election at each AGM—and five other members, each elected for four years. Elections from amongst the Club's membership are by a simple majority of those Members of the Club present and voting at an AGM or a Special General Meeting. A Member may be co-opted by the Committee to fill a temporary vacancy until the following AGM.

Objects of the Charity

The promotion of scientific discussion between Members of the British Ornithologists' Union (BOU) and others interested in ornithology, and to facilitate the dissemination of scientific information concerned with ornithology, with a particular emphasis on avian systematics, taxonomy and distribution. These objects are pursued through the Club's publications, especially the Bulletin published four times a year, and a regular programme of meetings.

The Committee

The Committee met six times during the year. Mr S. A. H. Statham was re-elected as *Hon. Secretary* and Mr D. J. Montier was re-elected *Hon. Treasurer* at the AGM on 24 April. D. J. Fisher and Dr R. P. Prŷs-Jones were elected in succession to I. R. Bishop, OBE, and C. W. R. Storey; no other changes to the Committee were proposed or made, as all other members were eligible to serve at least one more year in office.

The Committee continued its review of long-term objectives for the future of the BOC and welcomed Dr N. J. Collar as chairman of the Bulletin Subcommittee (BSC) (*vice* Prof. C. J. Feare). Membership of the BSC continued to comprise Dr R. J. Dowsett, Mr S. P. Dudley, Mr G. M. Kirwan (*Hon. Editor*) and Dr D. R. Wells; S. P. Dudley subsequently resigned his post later in the year.

Mr S. P. Dudley, BOU Administrator, continued his *ex-officio* roles as *Membership Secretary* and *Hon. Website Manager*, which form part of the work of the BOC Office under the terms of an agreement between the Club and the BOU established in 2004 (other duties include management of BOC publications, subscription management of BOC Institutional Subscribers to the Bulletin and other Bulletin-related items including servicing the BSC in an advisory capacity). Revd. T. W. Gladwin remained *Chairman* of the Joint Publications Committee and Prof. R. A. Cheke remained *Hon. Publications Officer*. Mr S. M. S. Gregory continued to progress the project for the electronic archiving and marketing of the complete set of the Bulletin.

The Committee continues to be most grateful to the Trustees of the Herbert Stevens Trust Fund (Mr Nigel Crocker, Mr Peter Oliver and Mr Richard Price) for their time and expertise advising on the performance of the Fund during the year.

Meetings

The number of evening meetings held at Imperial College, London, was reduced to six in 2007. A total of 176 (119 members and 57 guests) attended these meetings, which represented an average attendance of 29. The programme of speakers during the year covered both geographical and specific ornithological subjects. A palaeontological reappraisal of the original avifauna of Mauritius by Anthony Cheke and Dr Julian Hume started our programme, followed by a detailed insight by Dr Paul Donald into the peculiar natural history of the Raso Lark *Alauda razae*. An entertaining overview of swan-upping by Prof. Christopher Perrins filled the summer meeting and, in September, the Earl of Cranbrook gave a comprehensive address on swiftlets, whilst the final meeting of the year featured a panorama of the birds of Australia by David Fisher.

As in previous years, the April meeting following the AGM tool the form of a social evening, during which informal short talks and brief discussions were contributed by five participants. The Chairman preceded these with an update on *The BOC—A vision for the future?* The chief topic was the range of options for the future publication of the Bulletin. Tony Statham picked up the topic of dinner meetings and thanked all those members who had completed the questionnaire distributed with *Bull. Brit. Orn. Cl.* 127(1). A summary of the responses would be put to the committee to consider possible changes in 2008. The *Hon. Secretary* continued the evening's programme with a simple outline of the 'preferred terrestrial locomotion of avifauna'. Thereafter, Dr Julian Hume gave a brief outline of the conservation and status of Hawaiian birds, Dr Robert Prŷs-Jones described 'a case of long-distance fraud', and Ben Fisher concluded by reading a short extract from a letter written in 1946 by Dr Norman Joy. Regrettably, Imperial College increased their catering and venue charges again for 2007 requiring an increase in the cost of Club dinners to £22.50 per head.

The Bulletin

Vol. 127 comprised 348 pages, a recent record, in part due to the re-inclusion of the annual index within the main pages of the Bulletin. Thirty-two papers of broad geographical scope were published, albeit with the Neotropics particularly well represented. A new species of brush finch *(Atlapetes)* from Colombia was described in the December issue, and taxonomy and nomenclature remain Bulletin mainstays. In this respect, the recently announced close working cooperation between the *Hon. Editor* and the Standing Committee on Ornithological Nomenclature (SCON), is especially welcome (*Bull. Brit. Orn. Cl.* 127: 254).

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An Editorial Board was formed at the start of the year and its membership appears on the back cover of each issue. In the final throes of 2007, the Hon. Editor, the designer, Eng-Li Green, and Steven Gregory, who joined the Bulletin Subcommittee early in the year, were engaged in a bout of activity to revamp the Bulletin in time for the March 2008 issue evolving to a B5 format.

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Bulletin—Institutional Subscriptions

Subscriptions from Institutional Subscribers during 2007 totalled 107 (120 in 2006), with 28 in the UK and 79 overseas (26 different countries). Of the latter 36 were from North America, 27 from Europe (including Russia), seven from Australasia, five from Africa, three from Asia and one from South America.

Membership

As at 31 December 2007, there were 447 paid-up members (471 in 2006): 227 in the UK and 220 overseas (47 countries). Overseas members comprise Europe (93), North America (56), Australasia (24), Africa (19), Asia (16) and South America (12). The Club welcomed 12 new Members, but mourned the death of five (year of joining in brackets): I. R. Bishop (1994), D.V. Breese (2002), Dr W. Burnham (1995), C. A. R. Helm (1989) and J. W. Nash (1986).

Report of the BOC–BOU Joint Publications Committee.

Membership. Revd. T. W. Gladwin (*Chairman*), Prof. R. A. Cheke (*BOC Commissioning Editor* and *BOU Checklist Series Editor*), Mr S. P. Dudley (*Publications Manager*), Mr D. J. Montier, Prof. C. M. Perrins, Mr N. J. Redman and Mr S. A. H. Statham. This joint committee (JPC), which now conducts most of its business by e-mail, met once in 2007. The Chairman of the committee is alternately appointed by the BOC and the BOU. Nominated this year by the BOU, Tom Gladwin continues to chair the committee until April 2009. Mr D. J. Montier and Mr S. A. H. Statham are appointed by the BOC and Prof. C. M. Perrins and Mr N. J. Redman are appointed by the BOU. No titles were published during the year. There were no changes to the Committee's membership.

Forthcoming publications. *The birds of Borneo* and *The birds of Barbados* are now expected to be published in summer and autumn 2008 respectively, whilst it is anticipated that the manuscript of *The checklist of the birds of Britain and Ireland* will arrive in time to be published in late 2008 as part of the Union's 150th anniversary celebrations. The manuscript of *The Asian bird records of Richard Meinertzhagen* by Pamela Rasmussen and Robert Prŷs-Jones, which is expected in the first half of 2008, will form the next volume in the BOC's *Occasional Publications* series. As a result of reorganisation of Dutch museum services, the National Museum of Natural History Leiden withdrew their financial support for the important *Systematic Notes on Asian Birds* series. The BOC has agreed to fund at least two issues, which will also appear in the *Occasional Publications* series.

Nomenclature and taxonomy. To avoid confusion that arises where the English names used for a single species differ between different countries, the JPC has decided to adopt *Birds of the world: recommended English names* (Gill & Wright 2006) as the single source of the principal 'international' English names to be used in publications for which it is responsible. Authors will of course be free to include other vernacular names where appropriate. Gill & Wright adopted the third edition of *The Howard and Moore complete checklist of the birds of the world* (Dickinson 2003) as the taxonomic reference for their work. The JPC have therefore decided to similarly follow Gill & Wright in this respect, whilst recognising that there may be cases where an author may have reason to request use of an alternative system.

Finance

Assets of the Club at 31 December 2007, after deducting creditors and subscriptions received in advance, totalled £441,040, a reduction of £10,352 from December 2006. This is the result of a fall in the value of investments in the Herbert Stevens Fund of £14,283, partially offset by the net surplus on the Club's activities for the year of just £665 on unrestricted funds and £3,266 on the restricted Publications and Clancey bequest funds.

Total income for 2007 was £40,458, which was less than £200 different from the previous year, though the items making up that total showed much wider variations. Although there was a decline of about £260 in subscriptions in 2007, the main difference under this heading was due to a change to a calendar-year rather than a tax-year basis for the recovery of income tax on gift aid and deeds of covenant. This will straighten itself out in 2008. Higher distributions from the investments in the Herbert Stevens Fund, particularly from M&G Charifund, and higher interest rates from the COIF Charity deposits produced an increase of £2,300 in investment income, though this was largely offset by a drop of £2,000 in sales of publications.

Expenditure of £36,527 was marginally higher than in 2006, with a reduction in the cost of producing the Bulletin, on a change to new printers, being offset by an increase in administration expenses. So far £2,000 of expenditure has been in incurred on the cost of forthcoming publications. A further major expense item is the full provision of £5,000 to cover a grant approved by the Committee to continue the development of an internationally available website (the REFTAX Project) giving the location of 'bird type specimens' in national museum collections and links to those museums. The first instalment of this grant was paid during the year and, with work still to be completed, further instalments will be paid on receipt of satisfactory progress reports.

Investments

There have been no changes in the Herbert Stevens Fund and it remains invested in three charity unit trusts. The market value of the fund fell during the year to £273,766 (2006 £288,049) due to a decline in the value of M&G Charifund, despite the higher income distribution, and reflects the volatile conditions in stock markets during 2007. The remaining £49,000 within the total investments shown in the Balance Sheet is the Clancey bequest, which has now been switched into a fixed-interest deposit charity account with CAF Bank.

Reserves

A sum of £20,000 remains in a Designated Unrestricted Fund towards the cost of future publications, of which *The birds of Barbados*, *The birds of Borneo* and *The status of birds in Britain and Ireland* are expected to be published in 2008. The two restricted funds, the Clancey bequest and the Publications Fund totalled £63,122 at the year-end and are held as backing for new developments for the Bulletin or additions to other Club publications respectively. The investments that form a large part of the Unrestricted Funds built up from past legacies provide a regular source of income towards the Club's administrative expenses, whilst additional liquid funds are available to finance any of the future publications. This can involve substantial expenditure against only a slow payback, as can be expected with specialist publications that are highly valued, but fall within an inevitably limited market.

Risks

The Committee has reviewed the major risks to which the Club is exposed, particularly with regard to managing the Club's cash resources. Expenditure on the Bulletin is a major item and has a regular production schedule, but timing of other publications, particularly the joint Checklists, produced in conjunction with the BOU, are less predictable as they rely on dedicated work by authors working on an entirely voluntary basis and with other commitments of their own. The production timetable is regularly reviewed to ensure that sufficient resources are available when required. Investments are held in diversified portfolios within separately managed charity unit trusts providing an acceptable balance between security and risk. In particular, the Herbert Stevens Fund is managed by three Trustees, who report regularly to the Committee.

Trustees' Responsibilities

Under the Charities Act 1993, the Trustees are required to prepare a statement of accounts for each financial year that gives a true and fair view of the state of affairs of the charity at the end of the financial year and of the incoming resources and application of resources in the year. In preparing the statement the trustees are required to:

- Select suitable accounting policies and then apply them consistently;
- Make judgements and estimates that are reasonable and prudent;
- State whether applicable accounting standards and statements of recommended practice have been followed, subject to any material departures disclosed and explained in the statement of accounts;
- Prepare the financial accounts on the going concern basis unless it is inappropriate to presume that the charity will continue its operations.

The Trustees are responsible for keeping proper accounting records which disclose with reasonable accuracy at any time the financial position of the charity and to enable them to ensure that any statement of account prepared by them complies with the regulations under section 41(1) of the Charities Act 1993. They are also responsible for safeguarding the assets of the trust and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

Approved and signed on behalf of the Trustees
M. B. Casement
Cdr. M. B. Casement, OBE RN, Chairman Date: 29 April 2008

BRITISH ORNITHOLOGISTS' CLUB
Registered charity No. 279583
BALANCE SHEET—31 December 2007

	Notes	2007		*2006*	
		£	£	£	£
FIXED ASSETS					
Projection Equipment	2		-		*162*
INVESTMENTS					
At market value	3		322,766		*337,049*
CURRENT ASSETS					
Stock of publications		100		*100*	
Cash at bank and in hand		4,688		*962*	
Cash on deposit		122,024		*117,739*	
Prepayments		-		*80*	
Other debtors		1,171		*1,215*	
		127,983		*120,096*	
CURRENT LIABILITIES					
Subscriptions in advance		(4,146)		*(4,879)*	
Creditors falling due within one year		(5,563)		*(1,036)*	
			118,274		*114,181*
TOTAL ASSETS			441,040		*451,392*
FUNDS					
Unrestricted					
Designated	4		20,000		*20,000*
Other	5		357,918		*371,536*
			377,918		*391,536*
Restricted	6		63,122		*59,856*
			441,040		*451,392*

Approved and Signed on behalf of the Trustees
M. B. Casement
Cdr. M. B. Casement, OBE, RN
Chairman

Date: 29 April 2008

STATEMENT OF FINANCIAL ACTIVITIES—31 December 2007

		2007		*2006*
	Unrestricted	**Restricted**	**Total**	*Total*
	£	£	£	*£*
INCOMING RESOURCES				
SUBSCRIPTIONS				
Members	9,042	-	9,042	*9,131*
Institutional subscribers	3,676	-	3,676	*3,852*
Income Tax recoverable under Gift Aid & Deeds of Covenant	130	-	130	*748*
	12,848	-	12,848	*13,731*
DONATIONS	83	300	383	*139*
INVESTMENT INCOME				
Herbert Stevens Trust Fund	11,405	-	11,405	*10,637*
Barrington Trust Fund	-	-	-	*20*
Interest received	6,147	2,966	9,113	*7,536*
	17,552	2,966	20,518	*18,193*

SALES OF PUBLICATIONS					
Bulletin		495	-	495	*338*
Other BOC publications		484	-	484	*660*
Joint BOU/BOC publications		1,621	-	1,621	*3,638*
		2,600	-	2,600	*4,636*
OTHER INCOMING RESOURCES					
MEETINGS		3,958	-	3,958	*3,822*
OTHER INCOME		151	-	151	*90*
TOTAL INCOME		37,192	3,266	40,458	*40,611*
RESOURCES EXPENDED					
CHARITABLE EXPENDITURE					
BOC BULLETIN					
Production, printing and distribution		11,884	-	11,884	*12,885*
OTHER PUBLICATIONS					
Production costs		2,046	-	2,046	*6,554*
Publicity, postage and packing		613	-	613	*1,128*
GRANT	7	5,000	-	5,000	-
MEETINGS					
Room and equipment hire, speakers' expenses, etc.		1,337	-	1,337	*1,589*
Restaurant		3,934	-	3,934	*4,042*
ADMINISTRATION	8, 9	11,713	-	11,713	*10,267*
TOTAL EXPENDITURE		36,527	-	36,527	*36,465*
EXCESS OF INCOME OVER EXPENDITURE		665	3,266	3,931	*4,146*
(Decrease) / Increase in value of investments	5	(14,283)	-	(14,283)	*31,325*
		(13,618)	3,266	(10,352)	*35,471*
TOTAL FUNDS brought forward at 1 January 2007		391,536	59,856	451,392	*415,921*
TOTAL FUNDS at 31 December 2007		377,918	63,122	441,040	*451,392*

NOTES TO THE ACCOUNTS—31 December 2007

1. ACCOUNTING POLICIES

a) Basis of Accounts. The financial statements are prepared under the historical cost convention as modified by the inclusion of investments in the Herbert Stevens Trust Fund at market values. They are also prepared in accordance with the Financial Reporting Standards for Smaller Entities and follow the recommendations in Accounting and Reporting by Charities: Statement of Recommended Practice (revised 2005).

b) Investments and Cash Deposits. The Herbert Stevens Trust Fund is invested in quoted charity unit trusts and included as investments in the Balance Sheet at year-end market values. Income from this fund and from cash deposits shown in the Balance Sheet under Current Assets is included in Incoming Resources in the Statement of Financial Activities on a receipts basis. The Clancey bequest is held in a fixed-term deposit account which forms part of the total of investments in the Balance Sheet. Interest on this deposit account is brought into the Statement of Financial Activities on an accruals basis.

c) Subscriptions. Subscriptions for the current year and any arrears are included in Incoming Resources in the Statement of Financial Activities. Subscriptions received in advance are carried forward in the Balance Sheet as Current Liabilities.

d) Expenditure is accounted for on an accruals basis.

e) Depreciation. Depreciation of fixed assets is calculated to write off their value over their expected useful lives at an annual rate of 25% on cost.

f) Publications. The cost of publications is written off in the Statement of Financial Activities as incurred except for a nominal stock value of £100 carried in the Balance Sheet.

2. FIXED ASSETS

Projection Equipment		2007
		£
Cost at 1 January and 31 December 2007		648
Accumulated depreciation at 1 January 2007		486
Charge for the year		162
At 31 December 2007		648
Net Book Value:	At 31 December 2007	-
	At 31 December 2006	*162*

3. INVESTMENTS—at market value

	2007	*2006*
	£	*£*
UNRESTRICTED FUNDS		
Herbert Stevens Trust Fund	273,766	*288,049*
RESTRICTED FUNDS		
Clancey bequest	49,000	*49,000*
	322,766	*337,049*

All investments are held in the UK.

4. UNRESTRICTED DESIGNATED FUND

for future publications

	2007
	£
Balance at 1 January 2007	20,000
Designated during the year	-
Balance at 31 December 2007	20,000

5. OTHER UNRESTRICTED FUNDS

	GENERAL FUND	HERBERT STEVENS TRUST FUND	TOTAL
	£	£	£
Balances at 1 January 2007	83,487	288,049	371,536
Decrease in value of investments during year		(14,283)	(14,283)
Excess of income over expenditure	665		665
Balances at 31 December 2007	84,152	273,766	357,918

6. RESTRICTED FUNDS

	CLANCEY BEQUEST	PUBLICATIONS FUND	TOTAL
	£	£	£
Balances at 1 January 2007	55,341	4,515	59,856
Donation	300		300
Interest received	2,712	254	2,966
Balances at 31 December 2007	58,353	4,769	63,122

a. The Clancey bequest was donated by the late Dr P. A. Clancey with the request that it should be used to support and enhance the Club's Bulletin.

b. The Publications Fund is available to finance Club publications other than regular issues of the Bulletin.

7. GRANT

A Grant to further the development of an internationally available website for locating bird type specimens in national museum collections (the REFTAX Project), payable in three equal instalments, of which £1,666 was paid during the year.

8. ADMINISTRATION EXPENSES

	2007 £	*2006* *£*
Club's share of rental of storage unit	2,311	*1,378*
Audit and Independent Examination fees	600	*600*
Depreciation	162	*162*
BOU administration services	6,367	*6,034*
Other administration expenses	2,273	*2,093*
	11,713	*10,267*

9. REIMBURSEMENT OF EXPENSES

Trustees do not receive any remuneration or any reimbursement of costs they may incur in attending regular Trustee meetings. They are reimbursed for any other expenses incurred on behalf of the Club. The total amount reimbursed during the year was £753 (*2006 £553*).

INDEPENDENT EXAMINER'S REPORT TO THE TRUSTEES OF THE BRITISH ORNITHOLOGISTS' CLUB

I report on the accounts of the Club for the year ended 31st December 2007, which are set out on pages 79 to 82.

Respective responsibilities of Trustees and Examiner

The charity's Trustees are responsible for the preparation of the accounts. The charity's Trustees consider that an audit is not required for this year (under section 43(2) of the Charities Act 1993 (the 1993 Act)) and that an independent examination is needed. It is my responsibility to:

- Examine the accounts (under section 43(3)(a) of the 1993 Act);
- To follow the procedures laid down in the General Directions given by the Charity Commissioners (under section 43(7)(b) of the 1993 Act); and
- To state whether particular matters have come to my attention.

Basis of Independent Examiner's report

My examination was carried out in accordance with the General Directions given by the Charity Commissioners. An examination includes a review of the accounting records kept by the charity and a comparison of the accounts presented with those records. It also includes consideration of any unusual items or disclosures in the accounts, and the seeking of explanations from you as Trustees concerning any such matters. The procedures undertaken do not provide all the evidence that would be required in an audit and, consequently, I do not express an audit opinion on the view given by the accounts.

Independent Examiner's statement

In connection with my examination, no matter has come to my attention:

(1) which gives me reasonable cause to believe that, in any material respect, the requirements:
  - to keep accounting records in accordance with s41 of the 1993 Act; and
  - to prepare accounts which accord with the accounting records and to comply with the accounting requirements of the 1993 Act have not been met; or

(2) to which, in my opinion, attention should be drawn in order to enable a proper understanding of the accounts to be reached.

Alan Peal
Alan Peal ACA—Principal
Porritt Rainey
Chartered Accountants

29 April 2008

Studies of Socotran birds III. Morphological and mensural evidence for a 'new' species in the Rufous Sparrow *Passer motitensis* complex endemic to the island of Abd 'Al-Kuri, with the validation of *Passer insularis* Sclater & Hartlaub, 1881

by Guy M. Kirwan

Received 15 February 2007

The present study represents the third in a series of papers that seeks to re-examine the taxonomic status of avian forms described from the Socotran archipelago. It follows publications concerning the population of Nubian Nightjar *Caprimulgus nubicus*, which was previously regarded as an endemic subspecies, *jonesi* (Kirwan 2004), and a re-evaluation of species limits in Golden-winged Grosbeak *Rhynchostruthus socotranus* (Kirwan & Grieve 2007). These notes seek to stimulate renewed interest in taxonomic studies of Socotran birds, specifically to meet the challenge set by Martins (1996), who stated: 'There is a clear need for a review of the avifauna of Socotra which reflects contemporary systematic thinking.'

All originally described as species, the six allopatric groups (and nine constituent taxa) within the almost exclusively Afrotropical Rufous Sparrow *Passer motitensis* complex have suffered a rather checkered taxonomic history of late. Following their demotion to subspecies, this arrangement persisted through Moreau & Greenway (1962), White (1963) and Hall & Moreau (1970). Thus, despite the contrary opinions of van Someren (1922), Lynes (1926), Grant & Mackworth-Praed (1944), Bannerman (1948) and Macdonald (1957) concerning some or all of these taxa, it was not until Wolters (1982), who split *P. insularis*, from the island of Socotra, off north-east Africa, and Summers-Smith (1984, 1988), who separated *P. iagoensis*, from the Cape Verde archipelago, at the level of species that more than one species tended to be recognised by major works. This notwithstanding the riposte of Bourne (1986) to Summers-Smith (1984) wherein Bourne could find little to recommend the advancement of *iagoensis* to specific status beyond the need for 'a tiresome change of name'.

Thus, Sibley & Monroe (1990) recognised the following specifically: *P. iagoensis*, *P. insularis*, *P. rufocinctus* (including *cordofanicus* and *shelleyi*), from East Africa, and *P. motitensis*, from South Africa north to southern Angola (which arrangement was followed by Gill & Wright 2006). In contrast, Dowsett & Dowsett-Lemaire (1993), followed by Dickinson (2003) in his important world checklist, preferred to recognise just *motitensis* and *iagoensis* as species, and pointed to errors and inconsistencies in the work of Wolters and Sibley & Monroe. However, the relevant volume of the influential *The birds of Africa* elected to recognise *P. shelleyi* (spottily in Ethiopia and Somalia south to Kenya) and *P. cordofanicus* (from west-central Sudan to eastern Chad), in addition to the four taxa separated by Sibley & Monroe, specifically (Urban *in* Fry & Keith 2004), albeit not without criticism (Leonard & Demey 2006). Thus, in recent years, only *motitensis* and *iagoensis* have received reasonably widespread recognition as being meritorious of specific status (Cramp & Perrins 1994 and Hazevoet 1995 also afforded *iagoensis* such treatment).

Passer [*motitensis*] *insularis* Sclater & Hartlaub, 1881, was unsurprisingly (given its abundance, which is currently placed at *c.*230,000 individuals: R. F. Porter *in litt.* 2007) amongst the initial wave of taxa endemic to the ancient island of Socotra to be described, following the first scientific visit to the archipelago, by Sir Isaac Bayley Balfour, who spent almost seven weeks there in 1880. It was not until the considerably more extensive survey by Ogilvie-Grant & Forbes, in 1898–99, that *Passer* [*motitensis*] *hemileucus* Ogilvie-Grant & Forbes, 1899 (hereafter referred to as *P. hemileucus*), was discovered. The latter is endemic to Abd 'Al Kuri, a rather inhospitable island with no permanent running water, *c*.36.5 km east to west and a maximum of *c*.5 km north to south, which lies *c*.145 km west of the main island and rises to a maximum 743 m (Cheung & DeVantier 2006). Abd 'Al Kuri covers 133 km^2, whereas Socotra is 3,625 km^2 in area. Our knowledge of *insularis* has increased substantially (see, e.g., Kirwan *et al*. 1996) since even the work of Summers-Smith (1988), who was able to make scarcely even the most basic comments about the bird's natural history, but *hemileucus* has remained a mysterious taxon known almost solely from specimens, namely the type series and seven birds collected by Alec Forbes-Watson in spring 1964. In reporting on the latter collection, Ripley & Bond (1966), in an immense understatement, referred only to *hemileucus* being paler than *insularis*. In consequence the taxon's obvious distinctiveness has gone unappreciated, though its describers (Ogilvie-Grant & Forbes 1899) were clearly aware of this as their manuscript makes plain (even allowing for the fact that all such novelties were then afforded species status). Summers-Smith (1988) opined that 'although paler and slightly smaller the differences are not great enough to warrant their separation from the birds on Socotra even as a different race.' Clement *et al*. (1993), presumably impressed by Summers-Smith's statement as to the weak distinction, simply ignored *hemileucus*. Urban (2004), in contrast, noted it as being 'Much paler than *insularis*, underparts nearly pure white, black patch on chin of ♂ smaller, ♀ without dusky patch on throat', and also remarked on the overall smaller size of *hemileucus* (something which had not escaped, but apparently failed to impress, Summers-Smith). None of these commentators, with the exception of Dillon Ripley and Bond, appears to have examined the Forbes-Watson specimens, and it might be wondered whether the first two authors looked carefully at the, admittedly limited, material to hand in The Natural History Museum (Tring). In fact, *Passer hemileucus* appears as easily diagnosable as any other member of the Rufous Sparrow complex admitted to species status by Urban (2004).

Methods

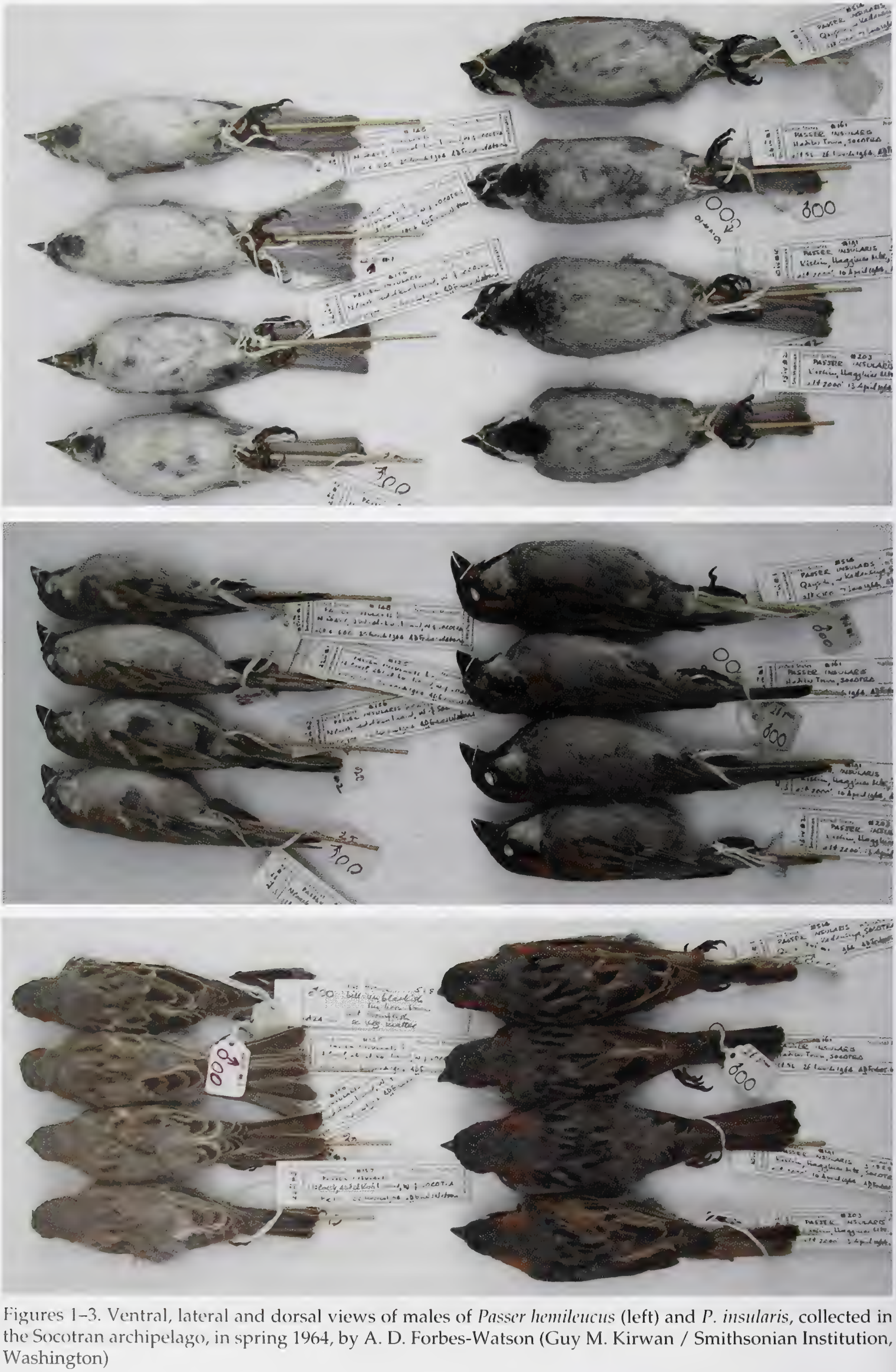
I acquired mensural data from specimens of both Socotran taxa held at The Natural History Museum (NHM, Tring), as follows: *Passer insularis* (Socotra: *n*=15, including nine males, one of them juvenile which was not included in the mensural analysis), and *Passer hemileucus* (Abd 'Al Kuri: *n*=2, including one male), and the National Museum of Natural History (Smithsonian Institution), Washington DC: *P. insularis* (Socotra: *n*=20, including ten males), and *P. hemileucus* (Abd 'Al Kuri: *n*=7, including four males). I did not examine the single male specimen of *hemileucus* or the seven (both sexes) of *insularis* held in the National Museums and Galleries on Merseyside, Liverpool (C. W. Fisher & T. Parker *in litt*. 2007) or the two specimens of *insularis* held at the University Museum of Zoology, Cambridge, UK. Note that Forbes-Watson's expedition report (which was never published) records that he took 28 males and 23 females of *insularis*, but the whereabouts of the additional specimens are unknown; notes in the Smithsonian collection report that specimens of some other species were sent as exchanges with museums in Africa, e.g. the Natural History Museum in Bulawayo (M. P. S. Irwin *in litt*. 2007). Mass data for these additional specimens are presented in the unpublished report and are repeated in Table 1. The types of both were examined: *P. insularis* (NHM 1881.3.21.20) and *P. hemileucus* (NHM 1899.8.11.131). The following data were obtained from each specimen: wing-chord (flattened) and tail-length, using a standard metal wing-rule with a perpendicular stop at zero (accurate to 0.5 mm), and culmen-length (to skull) and culmen-depth (at the feathers), using digital callipers (accurate to 0.01 mm). I also conducted a morphological examination of 33 specimens of *P. cordofanicus* and 29 of *P. shelleyi* held in NHM (including the holotype, NHM 1887.9.28.314, of *shelleyi*), these being the geographically most proximate forms within the complex in continental Africa, especially *P. shelleyi* which at least formerly maintained a toehold in north-westernmost Somalia (Ash & Miskell 1998).

Notes on plumage variation in both sexes of the two forms were taken and ranked according to their usefulness in distinguishing them. I attempted to conservatively score character differences for males using the system elucidated by Collar (2006), which will be fully tabled by Collar *et al.* (in prep.). Numbers in brackets refer to this scoring system, ranging from 3 for a dramatic difference to 1 for a more minor difference. A broad range of material, pertaining to both forms, was photographed, using a Nikon Coolpix 885 digital camera (see Figs. 1–6).

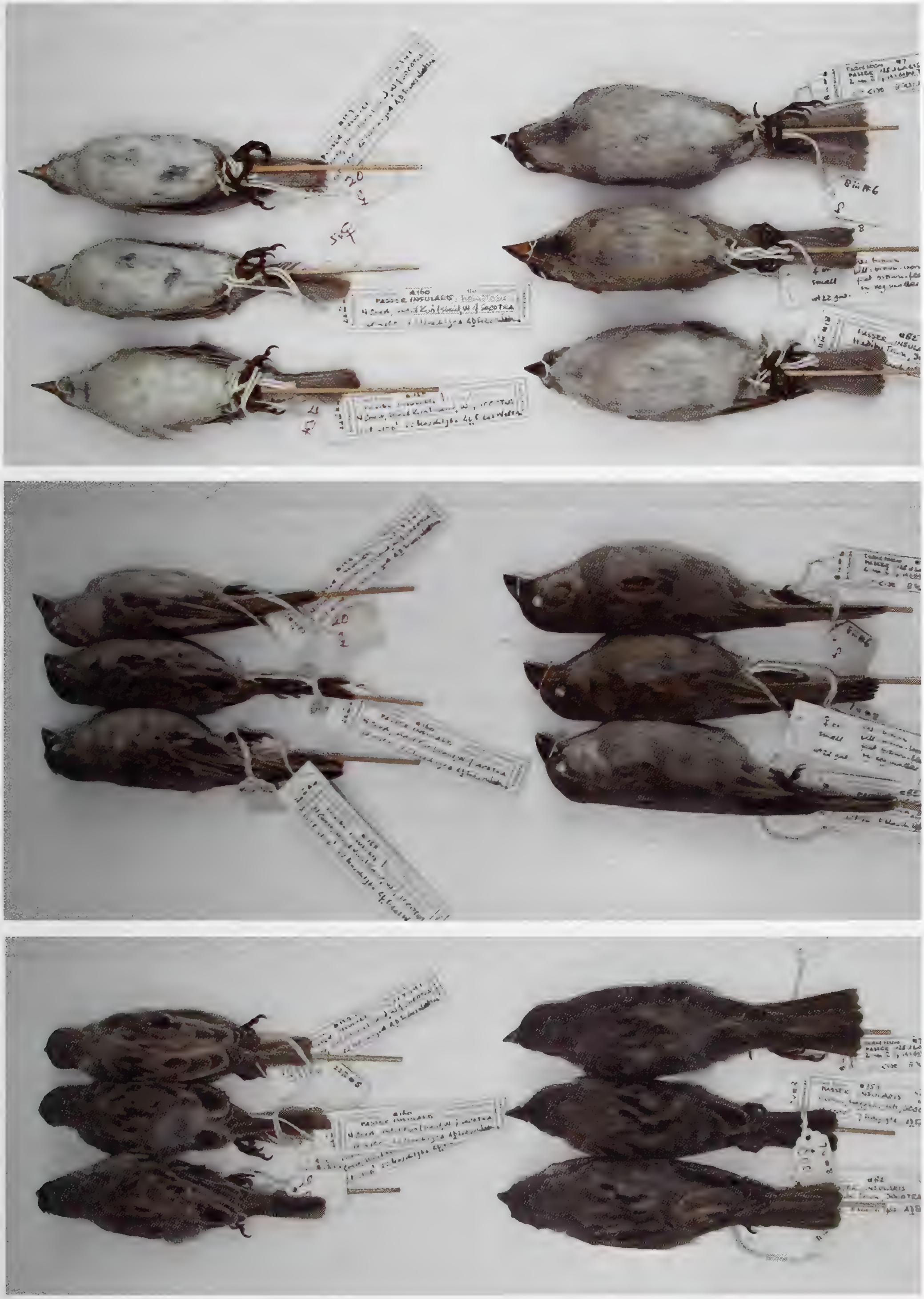
Results

Plumage analysis.—Comparison of plumage characters in *Passer insularis* and *P. hemileucus* revealed striking differences, coincident with the recognition of two species. In males, compared to *insularis*, *hemileucus* has much paler underparts lacking any of the dirty grey tones with which the entire underparts of *insularis* are washed and which contrast much more noticeably with the white cheeks in the latter form; the dark throat patch is confined to the bib in *hemileucus* but is far more expansive and more solidly black in *insularis* (Fig. 1), though R. F. Porter (*in litt.* 2007) cautions that it may appear smaller and less striking in February/March; the median coverts show prominent white tips in *hemileucus*, but much smaller, less obvious and grey-coloured ones in *insularis*, whilst the chestnut tones in the wing of *hemileucus* are much purer and less saturated than on *insularis*, recalling the difference between Eurasian Tree *P. montanus* and Spanish Sparrows *P. hispaniolensis*; the black ear-coverts are more restricted in *hemileucus*, and *insularis* also has more extensive and deeper black lores (Fig. 2); the crown-feathers have much paler centres in *hemileucus*; and finally the mantle and back are much browner and less heavily and darkly streaked in *hemileucus*, lacking many of the grey background hues of *insularis* overlain with broader and blacker streaks (Fig. 3). I scored two points each for the differences in head pattern, upperparts pattern and underparts coloration, with additional single points for the difference in wing pattern and size (see below), thus giving a total of eight points. The minor range of variation in these features in four males of each taxon is depicted in Figs. 1–3.

Females of the two taxa are almost equally distinctive. As evidenced by Figs. 4–6, female *hemileucus* has overall much whiter underparts than *insularis*, though like males *hemileucus* females exhibit some buffy tones especially on the breast and flanks, whilst *insularis* has overall much greyer underparts, though some variation is evident. No specimens of *hemileucus* show any evidence of a dark bib, a feature evident in all *insularis*, though one (NMNH 518324) almost lacks any trace, dark feathering being confined to the bases of the central throat (Fig. 4). *P. hemileucus* has a more obvious pale supercilium behind the eye and lacks any trace of dark feathering on the ear-coverts (female *insularis* are more male-like); like males, female *hemileucus* shows reasonably prominent pale tips to the median coverts, which are not apparent in *insularis*; and, again as in males, *hemileucus* has generally much browner upperparts with slightly browner and less broad streaking on the mantle and back, compared to the generally much greyer and darker upperparts of *insularis*, marked with generally broader and blacker streaking. Females of these two taxa would seem to be far



Figures 1–3. Ventral, lateral and dorsal views of males of *Passer hemileucus* (left) and *P. insularis*, collected in the Socotran archipelago, in spring 1964, by A. D. Forbes-Watson (Guy M. Kirwan / Smithsonian Institution, Washington)



Figures 4–6. Ventral, lateral and dorsal views of females of *Passer hemileucus* (left) and *P. insularis*, collected in the Socotran archipelago, in spring 1964, by A. D. Forbes-Watson (Guy M. Kirwan / Smithsonian Institution, Washington)

more readily identifiable in a field context than, for example, those of House *P. domesticus* and Spanish Sparrows.

Male *hemileucus* differs from *shelleyi* in having greyer upperparts with much paler and narrower dark streaking, paler brown tertial centres and rectrices, a greyer crown, lack of any rufous in the rump, less bold and solid black ear-coverts and bib, and the rufous supercilіary does not wrap around the rear edge of the ear-coverts. Female *hemileucus* also lacks the rufous rump of female *shelleyi*, any rufous in the mantle, has much fainter upperparts streaking, a much paler crown, tertials and flight-feathers, and lacks any trace of a bib (quite noticeable in *shelleyi*).

Compared to male *hemileucus*, the same sex of *cordofanicus* has a rufous rump, the mantle and back are overlain with sparse but very deep black streaking (dark brown streaking in *hemileucus*), the flight-feathers are darker, the white tips to the wing-coverts are seemingly narrower, the rufous superciliary continues to wrap around the ear-coverts, and the bib and upper border to the ear-coverts are both deep black. Unlike *hemileucus*, female *cordofanicus* is rather similar to the male of that taxon, except that it has a much paler (greyer) but still rather extensive bib; furthermore the crown is much darker grey than in female *hemileucus*.

Finally, compared to these two mainland African forms, *insularis* is clearly differentiated by a broad range of characters, e.g. rump coloration, underparts coloration etc. The closest of the *motitensis* group in plumage is *rufocinctus* (Kenya and northern Tanzania; 53 specimens examined in NHM). Male *insularis* differs from *rufocinctus* in the following: lack of rufous rump; darker grey upperparts with narrower, slightly less black streaking (especially noticeable on the crown / nape); more diffuse, slightly larger and less deep black bib; on average greyer underparts; ear-coverts largely white (grey in *rufocinctus*) with black eye-stripe (absent in *rufocinctus*); greater coverts with much more rufous (generally none in *rufocinctus*); a larger bill; whilst the irides are pale in *rufocinctus* but dark in *insularis*. Female *rufocinctus* has a rufous rump and lesser coverts, heavier black upperparts streaking, a more noticeable and more extensive grey ('shadow') bib, greyer ear-coverts (white in *insularis*), generally more grey-saturated crown and nape (dark feather bases more noticeable in *insularis*), and a shorter bill.

Morphometrics.—Mensural data appertaining to the two Socotran taxa are presented in Table 1. These reveal the rather obvious differences in their relative sizes. Compared to *insularis*, *hemileucus* is shorter winged, shorter tailed, smaller billed (particularly obviously in bill-depth, much less so in culmen-length), and lighter in weight. These differences are readily apparent in both sexes and, particularly in wing- and tail-length, there being no or very little overlap between the two taxa.

Discussion

Vocal data are non-existent for *P. hemileucus* and rather weak (few sound-recordings) for *P. insularis*. In any case differentiation in *Passer* is generally rather weakly expressed in terms of vocalisations, songs being rather unspecialised although they do possess an advertising function (Cramp & Perrins 1994). The available data concerning plumage and morphometrics unambiguously supports recognition of two species under any species concept currently operating, including all of the pattern-defined concepts (Sluys & Hazevoet 1999), the Metapopulation Lineage Concept or General Species Concept (de Queiroz 2005) or any of the more modern interpretations of the Biological Species Concept (e.g. Helbig *et al*. 2002, Collar 2006, Collar *et al*. in prep.). The differences between either sex of *insularis* and *hemileucus* are clearly as great as between any of the other members of the Rufous Sparrow *P. motitensis* complex currently recognised at species level, as well as between any of the five members of the (also Afrotropical) Grey-headed Sparrow superspecies *P. griseus* sometimes accorded specific recognition (see Urban 2004). Indeed, it is interesting to note the quite close morphological resemblance between both sexes (but especially males) of *hemileucus* and those of Sind Jungle Sparrow *P. pyrrhonotus* of south-east Iran to north-west India, which fact was noted by the authors of the new taxon but which has apparently escaped more recent commentators (Fig. 7). The substantial difference in size between *hemileucus* and *insularis* would presumably act as a significant barrier to the chances of their interbreeding should they come into contact.

Almost nothing has been published concerning the habits and behaviour of *P. hemileucus*, although it has been found in most parts of the island of Abd 'Al Kuri (R. F. Porter *in litt.* 2007), the only data being those recorded by Ogilvie-Grant & Forbes (1903), who found it to be unassociated with Man, in obvious contrast to *insularis*. They stated:

'It was never seen in the neighbourhood of the native village, but appeared to be confined to the bush-clad slopes of one of the highest points, where enormous limestone blocks which have fallen away from the summit lie scattered over the hillside. Here it makes its home, and we found it by no means an easy task to secure specimens for they are very shy and not very numerous [*contra* the statement in Kirwan *et al.* 1996] . . . A small flock, however, kept flitting about near me on the stems of the bizarre Milk-bushes (*Euphorbia Abdelkuri*) growing about in the middle of the mountain, while I was engaged in digging up the fine specimen of this new plant, which eventually reached home alive—*H.O.F.*'

In 1964, Alec Forbes-Watson's experience (as recorded in his unpublished expedition report) was slightly different. He managed to collect seven of the dozen birds seen, but intially found them very wild and unapproachable in the hills. However, two days later (on 22 March), AF-W found *hemileucus* at a settlement on the north coast 'behaving like *P. domesticus* or their relatives on Socotra'. Despite their shyness and AF-W's persistence in collecting them, the birds consistently returned to a single *Salvadoria* bush, which was 'the only greenery in sight'. A juvenile has been trapped in late March (Fig. 8; R. F. Porter *in litt.* 2006). Future ornithological studies on Abd 'Al-Kuri will prioritise documenting this sparrow's population, range and habitat preferences, and any apparent threats (R. F. Porter *in litt.* 2007). *P. hemileucus* has been confirmed to breed in four of the island's six UTM grid squares and presence established in one other (R. F. Porter *in litt.* 2007), suggesting that its population is perhaps secure at present, but its conservation status, if species status were to be generally admitted, clearly requires evaluation, as *hemileucus* is confined to a small island and probably has an overall small population.

Fresh material pertaining to *hemileucus* and *insularis* will be of value to molecular studies that should seek to date the divergence between the two forms, although the Forbes-Watson material is sufficiently recent to permit such an undertaking with relative ease (Payne & Sorensen 2003). Socotra originally formed part of the African–Arabian tectonic plate (it represents a continuation of the Somali peninsula) and probably became isolated by the same series of dislocations during the break-up of Gondwana that produced the Gulf of Aden in the late Tertiary, at least 10MYA (Laughton *et al.* 1970). The Socotra Platform on which all of the islands lie, a small continental granite block over which the seas are relatively shallow, has experienced relative tectonic stability since *c.*6–8MYA and particularly since the onset of the Pliocene (Fournier *et al.* 2001). Periods of uplift in the general region of the southern Gulf of Aden terminated *c.*2MYA. During the Last Glacial Maximum (20,000–25,000 years ago), when sea levels were up to 120 m lower than in the present day, the coastal plain of the main island of Socotra was much larger than now and encompassed

TABLE 1

Mensural and weight data for *Passer insularis* and *P. hemileucus*. All measurements in mm; weight in g. Personal measurements (from specimens in The Natural History Museum, Tring, and National Museum of Natural History, Washington DC) were taken using a standard metal wing-rule with a perpendicular stop at zero (accurate to 0.5 mm), and digital callipers (accurate to 0.01 mm). Dymond (1993) did not take comparable measurements for culmen-length and did not measure bill-depth.

Taxon	**Sex**	**Sample size**	**Wing-length**	**Tail-length**	**Culmen (to skull)**	**Bill-depth**	**Mass (reference)**
P. insularis							
	male	18	72.5–78.5	58–65	15.12–17.04 (*n*=16)	8.58–10.13	20–33 (Forbes-Watson unpubl.)
means			76.19	60.55	16.16	9.37	26.32 (*n*=28)
	female	16	71.0–76.5	52–63	15.41–17.51	8.80–10.06	22–35 (Forbes-Watson unpubl.)
means			73.75	58.12	16.49	9.44	27.52 (*n*=23)
Published data	male	5	74–79	53.5–61.0			25.0–29.2
from Dymond			74	58.6			27.5
(1996), range	female	4	72–76	58.0–60.5			26.0–29.1
plus means			74.7	59.2			27.1
P. hemileucus							
	male	5	70.5–73.0	53–57	15.05–16.74	7.90–8.83	20–25 (Forbes-Watson unpubl.)
means			72.3	55	15.75	8.3	23.0 (*n*=4)
	female	4	67.0–69.5	50–54	14.66–15.57	7.39–8.94	20–24 (Forbes-Watson unpubl.)
means			68.6	52.5	15.18	8.22	21.33 (*n*=3)

the islands of Darsa and Samha (The Brothers) which lie almost equally equidistant between the main island and Abd 'Al Kuri. Indeed, because of the generally shallow seas between Socotra and The Brothers (30–50 m), land bridges between these islands existed on several occasions during the Upper Pleistocene, occurring in 100,000-year cycles (Cheung & DeVantier 2006). It is unsurprising in the present context therefore that Samha and Darsa should host typical *P. insularis* (R. F. Porter *in litt.* 2006), though P. G. Ryan (*in litt.* 2007) has remarked that populations on these two islands are small, rather like *hemileucus*, and lack the grey extending onto the breast. Populations on all four islands thus require some further research into their taxonomy and relationships. Abd 'Al Kuri, unlike the other satellite islands of Socotra, has been long separated from the main island with resultant levels of endemism, e.g. amongst reptiles (Rösler & Wranik 2004), plants (Miller & Morris 2004), molluscs (Neubert 2002) and marine fishes (Klaus & Turner 2004), whilst one other endemic bird taxon, *Onychognathus blythii creaghi*, has been described from Abd 'Al Kuri, though its validity requires further investigation (Kirwan 2007).

The degree of differentiation between the *Passer* taxa in the Socotra archipelago might suggest separate colonisation events, perhaps even involving different metapopulations from Africa and Asia. The phylogeographic study of western Indian Ocean sunbirds conducted by Warren *et al.* (2003) offers an interesting case study with some parallels to the Socotran situation. Most of the latter islands' breeding birds are clearly of Afrotropical origin, as long ago noted by Chapin (1932), but there has been, as yet, no attempt to date the different colonisation events that presumably occurred, nor efforts to test whether some of the endemic taxa might be of Asian ancestry, for example the grosbeak *Rhynchostruthus socotranus* (see Kirwan & Grieve 2007).

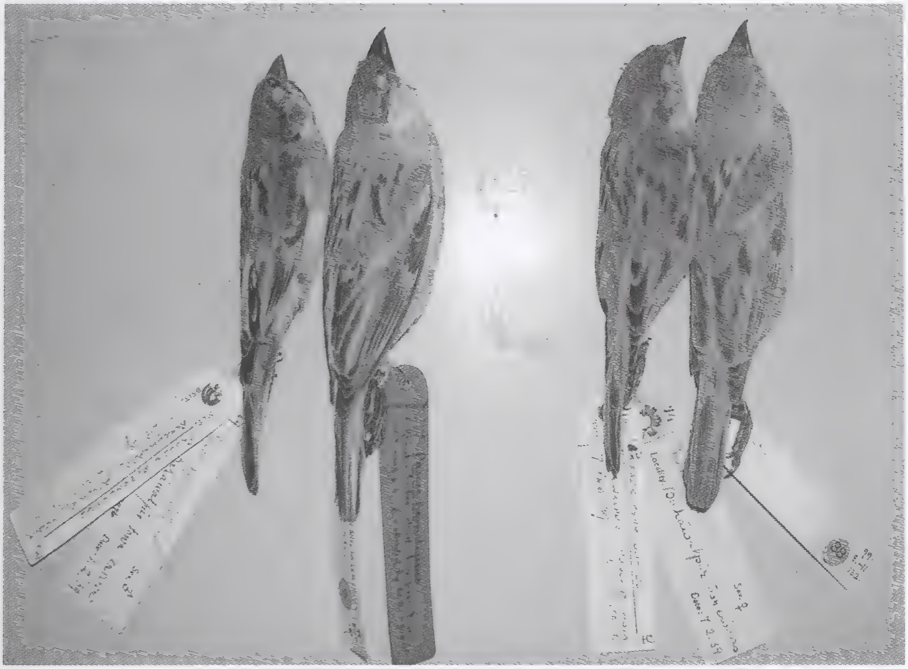


Figure 7. Comparison between both sexes of *Passer hemileucus* and *P. pyrrhonotus*, from left to right: male *P. pyrrhonotus*, male *P. hemileucus*, female *P. pyrrhonotus* and female *P. hemileucus* (Guy M. Kirwan, © Natural History Museum, Tring)

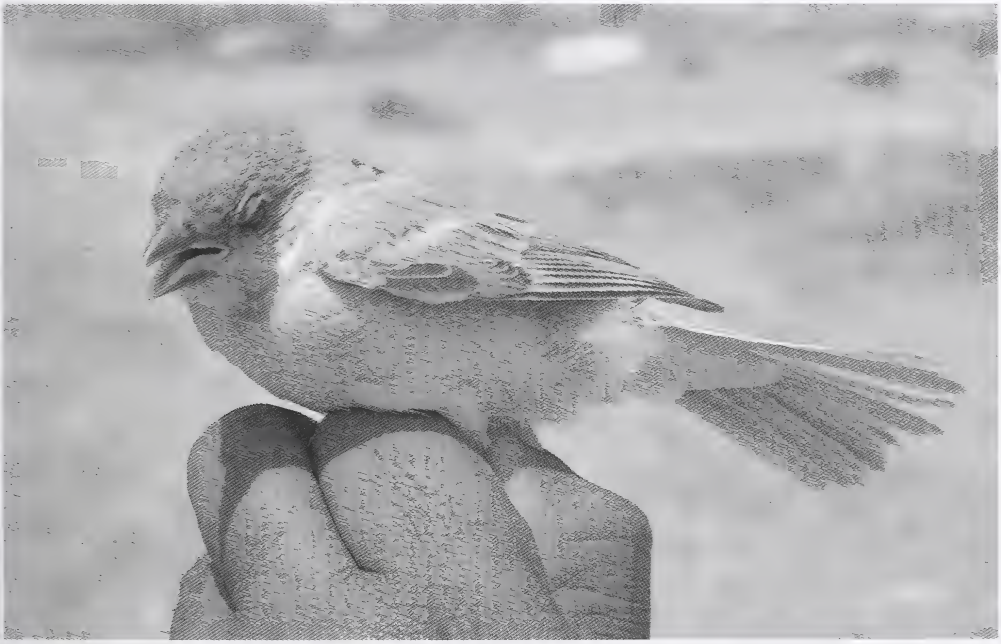


Figure 8. Juvenile *Passer hemileucus*, Abd 'Al Kuri, Socotra, late March (Ahmed Saeed Suleiman & Nadim Taleb / Socotra Conservation & Development Programme)

This study reconfirms the importance of the Forbes-Watson collection from the Socotran archipelago and the unpublished expedition report (see Kirwan 1997), not only for taxonomic studies of the islands' birds but also many aspects of their natural history. The 523 specimens that originally constituted the collection are a remarkable testament to Forbes-Watson and his two Kenyan taxidermists, and continue to represent the best (and most beautifully prepared) series of birds from Socotra; the previous lack of attention that has been paid to this resource borders on the extraordinary.

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Taxonomic status of the Kinabalu 'linchi' swiftlet

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Swiftlets (Apodidae: Collocalini) are some of the most under-studied and taxonomically difficult birds in the Old World tropics. The species are mostly small with drab black, grey or brown plumage, sometimes with white or gloss. Swiftlets are aerial insectivores and construct nests of their own saliva with or without exogenous material such as lichens, moss or feathers. Nests are placed in caves or below overhangs, such as cliffs or eaves of houses. Particular attention has been paid by taxonomists to the echo-locating swiftlets (*Aerodramus*), in part due to the commercial value of some species that construct edible nests (Francis 1987, Kang *et al.* 1991). *Aerodramus* presents difficult taxonomic problems because many species are cryptic and are distinguished only by the type of nest they construct or their geographic distribution (e.g., Medway 1966, 1975, Price *et al.* 2004). The other main group is the white-bellied swiftlets, *Collocalia*. Although there are fewer species of *Collocalia sensu stricto* than *Aerodramus* (three vs. 22; Chantler 1999), their taxonomy presents substantial challenges. The most widespread species, Glossy Swiftlet *C. esculenta*, spans an enormous range, from the Andamans and Nicobars in the Indian Ocean to the Solomons in the Pacific, and it exhibits substantial geographic variation, as suggested by its division into 32 subspecies (Salomonsen 1983, Chantler 1999, Dickinson 2003). Not only are the phylogenetic relationships of many taxa within this polytypic complex unknown, particular confusion surrounds the relationship between Glossy and Cave Swiftlets *C. linchi* of the Indonesian archipelago. These two taxa are considered conspecific by some authorities (Inskipp *et al.* 1996, Smythies 1999) and separate species by others (Somadikarta 1986, Chantler 1999). The third *Collocalia* species, Pygmy Swiftlet *Collocalia troglodytes*, is clearly the sister of the other two (Price *et al.* 2004, Thomassen *et al.* 2005). To shed light on the relationship between Glossy and Cave Swiftlets, we address an issue that is especially pertinent: the phylogenetic position of an enigmatic white-bellied swiftlet found in Sabah, Malaysian Borneo.

In 1905 a swiftlet was shot on the slopes of Mt Kinabalu in northern Borneo (elevation unknown) and described as *Collocalia dodgei* (Richmond 1905). In several respects, it resembled *C. esculenta*, the commonest swiftlet in both lowland and montane Borneo. Like *C. esculenta*, it had a whitish belly, but its dark upperparts exhibited a greenish gloss in contrast to the bluish gloss of *C. esculenta*. (These glosses are both wear-associated differences.) It was also noticeably smaller and lacked the whitish tail spots and toe feathering commonly found in *C. esculenta*. In 1937, two additional specimens were collected at 1,500 m on Mt Kinabalu and ascribed to *dodgei* based on their greenish gloss and small size. Cranbrook *et al.* (2005) described the history of subsequent taxonomic treatments of *dodgei*. Chasen (1935) merged *C. dodgei* as a subspecies of *C. esculenta*. For some years, there was confusion as to whether *dodgei* was the sole Bornean subspecies of *C. esculenta* (e.g., Smythies 1960), and eventually two subspecies were recognised in Borneo, *dodgei* on Mt Kinabalu and *cyanoptila* over the rest of the island (e.g., Smythies 1981). This classification persists (e.g., Inskipp *et al.* 1996, Smythies 1999), but recent authors have acknowledged that parapatric (and possibly sympatric) occurrence of the two taxa on upper and lower slopes of Mt Kinabalu suggests the existence of distinct species. Indeed, Somadikarta (1986) reviewed the history of white-bellied swiftlet taxonomy and, following an extensive examination of morphology and mensural data, concluded that *dodgei* was a subspecies of *C. linchi*, along with three other taxa: *linchi* on Java and the satellite islands of Madura, Bawean and Nusa Penida; *ripleyi* in montane Sumatra; and *dedii* on Bali and Lombok. This arrangement is commonly accepted (MacKinnon & Phillipps 1993, Chantler & Driessens 1995, Chantler 1999, Dickinson 2003) and solves the problem of parapatric or sympatric subspecies on Mt Kinabalu. The morphological distinction between *C. esculenta* and *C. linchi* is supported by molecular phylogenetic comparisons. Using two mitochondrial gene sequences, Price *et al.* (2004) found that an individual of *C. linchi* from Java appeared (with low bootstrap support) to be sister to *C. esculenta*, represented by subspecies from Malaya, Borneo, Philippines, New Guinea and the Solomons. Thomassen *et al.* (2003, 2005), also using mtDNA markers, recovered the same sister relationship between *C. linchi* and *C. esculenta*. Although Thomassen *et al.* (2003, 2005) used multiple individuals of *C. linchi* and *C. esculenta*, it is impossible to infer relationships among potential *C. linchi* taxa because the authors provided no subspecific names or locality information for their samples, nor did they discuss relationships within *C. linchi*.

The suggestion by Somadikarta (1986), on morphological grounds, that *dodgei* is a member of *C. linchi*, and the subsequent molecular demonstrations that *C. linchi* is the sister group of *C. esculenta*, solves the problem of parapatric (or sympatric) white-bellied swiftlets on Mt Kinabalu; they are members of different species. However, the question remains whether *dodgei* from Kinabalu is truly a member of *C. linchi* or a separate species. To address this issue, we obtained specimens of *dodgei* and *C. esculenta cyanoptila* from Mt Kinabalu and examined their evolutionary affinities using mtDNA sequences and morphological characters. For these comparisons, we not only produced our own DNA sequence data but also took advantage of the extensive mtDNA dataset published by Price *et al.* (2004), and the morphological data of Somadikarta (1986).

Materials and methods

We included three individuals of *C. esculenta cyanoptila* from *c.*1,500 m on the south side of Mt Kinabalu and two individuals of unknown identity (but presumably *dodgei*) from *c.*2,730 m, also on the south side of Mt Kinabalu. These two were nestlings close to fledging, with primaries still in the feather sheaths. The base colour of their upperparts is dark brown with a faint green gloss. Characteristic of *C. linchi*, their hind-toes lack the feather tuft found in *C. esculenta*, and their bellies are white, as opposed to the pale grey of *C. esculenta* taken at 1,500 m. The nest, found in the eaves of a hut, was a cup of rootlets, plant fibres and several types of lichens. It was attached to beams on two sides by hardened saliva.

DNA was extracted from muscle tissue using proteinase K digestion following the manufacturer's protocol (Dneasy tissue kit, Qiagen). For this study, we compared the entire second subunit of mitochondrial nicotinamide adenine dinucleotide dehydrogenase (ND2). Primers for the ND2 gene were L5215 (Hackett 1996), H6313, L5758 and H5766 (Johnson & Sorenson 1998). We purified PCR products with Perfectprep PCR cleanup kits (Eppendorf). Sequencing of purified PCR products was performed with BigDye Terminator Cycle Sequencing Kits (Applied Biosystems). Primers used for PCR were also used for cycle-sequencing reactions, resulting in bi-directional sequence for all taxa. Cycle-sequencing products were run on an ABI Prism 3130xl automated DNA sequencer (Perkin-Elmer Applied Biosystems). The computer programme Sequencher 4.7 (Genecodes) was used to reconcile chromatograms of complementary fragments and align sequences across taxa.

We analysed the data using maximum parsimony and maximum likelihood (ML) criteria in PAUP*4.0b10 (Swofford 2002). For ML analyses, Modeltest 3.7 (Posada & Crandall 1998) determined both the appropriate model of nucleotide substitution under the AIC criteria (see Posada & Buckley 2004) and the estimated parameter values. In parsimony analyses all characters were equally weighted. Support for nodes in the resulting phylogenetic hypotheses was assessed via non-parametric bootstrapping (Felsenstein 1985) and reanalysis of the resulting data (100 replicates).

Results

The aligned ND2 sequences yielded a matrix of 21 individuals (19 *Collocalia*, two outgroup *Aerodramus*) and 1,041 characters (Table 1). These included five individuals that we sequenced and 16 individuals from Price *et al.* (2004). All new sequences (GenBank EF600707–711) appeared to be mtDNA, rather than nuclear copies. They contained no stop codons, no conflicts in overlapping fragments, homogeneous base composition across taxa (chi-square p=1.00), expected codon-position divergences (3>1>2), and no unusual relationships amongst taxa. Base composition was biased towards adenine and cytosine (A=0.32, C=0.35, G=0.09, T=0.24) but consistent with other bird groups (e.g. Kirchman *et al.* 2001, Moyle *et al.* 2005).

Uncorrected pairwise divergences (p-distances) amongst taxa ranged from 0% between several pairs of individuals to 13.6% between *Collocalia troglodytes* and one outgroup taxon (Edible-nest Swiftlet *Aerodramus fuciphagus*). The two Kinabalu specimens had identical ND2 sequences, were 4.5% divergent from the Javan sample of *C. linchi*, and were 7.4–7.5% divergent from the three *C. esculenta* collected downslope from them on Mt Kinabalu.

Of 1,041 nucleotide positions, 118 were potentially parsimony informative. Modeltest (Posada & Crandall 1998) indicated a model of nucleotide substitution (TrN+G) that incorporated one class of transversions, two classes of transitions, and gamma distributed rates across sites. Parameter estimates for the data were as follows: base frequencies (0.332, 0.358, 0.090), rate matrix (1.0000, 37.4273, 1.0000, 1.0000, 26.2609), and shape (0.2168). Parsimony (nine most parsimonious trees of 444 steps with consistency indices of 0.694) and likelihood (one tree with -lnL = 3426.64578) analyses produced trees with no significant discrepancies (Fig. 1). Differences between our ML tree and that of Price *et al.* (2004) were minor and probably due to the latter's inclusion of an additional mitochondrial marker. *Collocalia troglodytes* was reconstructed as the sister of all other *Collocalia* sampled. *C. e. cyanoptila* from the Malay Peninsula and Borneo comprised a clade and only diverged from one another by a maximum of 0.7%. The only structure within that clade united the two Malayan individuals (Selangor) as distinct from the Borneo individuals. Sister to this large *cyanoptila* clade was a clade of four *C. esculenta* from the Philippines, two each from Sibuyan (*marginata*) and Mindanao (*bagobo*). Taxa from each island were monophyletic and supported as sisters by low ML bootstrap support (66) but high MP bootstrap support (88). The single individual of *C. linchi* from Java and the two Kinabalu birds formed a clade sister to Bornean and Philippine *C. esculenta*. Although the Javan and Kinabalu samples were substantially diverged from one another (4.5%), they were united as sister taxa with high bootstrap support (100 ML, 98 MP). A sister-pair of individuals from the far south-eastern portion of the *C. esculenta* range (New Guinea and Solomons) was sister to the clade comprising *C. linchi* and all other *C. esculenta* samples. Although the groups of taxa and geographic units (*C. linchi*, *C. e. cyanoptila*, Philippine birds, etc.) were well supported, bootstrap re-sampling indicated low confidence in the arrangement of these clades relative to one another.

TABLE 1
Samples included in the study. Source information: University of Kansas Natural History Museum, Lawrence (KUNHM); Field Museum of Natural History, Chicago (FMNH); Louisiana State University Museum of Natural Science, Baton Rouge (LSUMNS); and University of Washington Burke Museum (UWBM).

Species	Source	ID/Voucher	Locality
Aerodramus fuciphagus vestitus[1]	KUNHM	DMT027	Gomantong Caves, Sabah, Malaysia (Borneo)
Aerodramus maximus lowi[1]	KUNHM	DMT040	Gomantong Caves, Sabah, Malaysia (Borneo)
Collocalia troglodytes[1]	FMNH	358312	Sibuyan, Philippines
Collocalia esculenta bagobo (1)[1]	FMNH	357435	Mindanao, Philippines
Collocalia esculenta bagobo (2)[1]	FMNH	357440	Mindanao, Philippines
Collocalia esculenta marginata (1)[1]	FMNH	358301	Sibuyan, Philippines
Collocalia esculenta marginata (2)[1]	FMNH	358303	Sibuyan, Philippines
Collocalia esculenta becki[1]	UWBM	60227	Isabel Islands, Solomons
Collocalia esculenta nitens[1]	KUNHM	Msp068	New Guinea
Collocalia esculenta cyanoptila (1)[1]	KUNHM	DHC88	Lahad Datu, Sabah, Malaysia (Borneo)
Collocalia esculenta cyanoptila (2)[1]	KUNHM	DHC97	Lahad Datu, Sabah, Malaysia (Borneo)
Collocalia esculenta cyanoptila (3)[1]	KUNHM	DMT050	Sandakan, Sabah, Malaysia (Borneo)
Collocalia esculenta cyanoptila (4)[1]	KUNHM	DMT051	Sandakan, Sabah, Malaysia (Borneo)
Collocalia esculenta cyanoptila (5)[1]	KUNHM	DMT057	Selangor, Malaysia
Collocalia esculenta cyanoptila (6)[1]	KUNHM	DMT059	Selangor, Malaysia
Collocalia esculenta cyanoptila (7)	LSUMNS	B50298	Mt Kinabalu, Sabah, Malaysia (Borneo)
Collocalia esculenta cyanoptila (8)	LSUMNS	B50302	Mt Kinabalu, Sabah, Malaysia (Borneo)
Collocalia esculenta cyanoptila (9)	LSUMNS	B50304	Mt Kinabalu, Sabah, Malaysia (Borneo)
Collocalia linchi[1]	KUNHM	DHC72	Bogor, Java, Indonesia
Kinabalu swiftlet (1)	LSUMNS	B52699	Mt Kinabalu, Sabah, Malaysia (Borneo)
Kinabalu swiftlet (2)	LSUMNS	B52700	Mt Kinabalu, Sabah, Malaysia (Borneo)

[1] from Price *et al*. 2004.

Discussion

Molecular data indicate the monophyly of *C. linchi* populations embedded within *C. esculenta* (Thomassen *et al*. 2003, 2005; this study). Moreover, morphological characters, especially hind-toe feathering, small size and spotting on the rectrices, as well as sympatry of *C. esculenta* and *C. linchi* in Borneo and Sumatra, support the maintenance of *C. linchi* as a species separate from *C. esculenta*. The question remains, however, how to treat allopatric populations within *C. linchi* and *C. esculenta*. *C. esculenta* has a large range with numerous unsampled island populations and is in need of more detailed taxonomic work, which might elect to elevate a number of taxa to species status, but is beyond the scope of this study. There is, however, sufficient information on *C. linchi* populations to draw some conclusions as to their specific status.

C. linchi has a restricted, allopatric distribution on various Sundaic islands and has already been subject to extensive morphological study (Somadikarta 1986). Wing- and tail-length differences readily differentiate Mt Kinabalu specimens from all other populations of *linchi* (Table 2). In both dimensions, *dodgei* was found to be significantly smaller than the other three subspecies, and the range of its standard deviation did not overlap any of the others. Thus, morphology clearly delineates a disjunction between *dodgei* and other populations of *C. linchi*.

Molecular data also indicate the distinctiveness of *dodgei*. The uncorrected genetic divergence between the Kinabalu specimens and that from Java is 4.5%. This level of divergence is often found between species (e.g., Filardi & Moyle 2005, Sheldon *et al*. 2005) and even genera of birds (Johns & Avise 1998, Whittingham *et al.* 2002). Although determining taxonomic rank solely on genetic divergence is problematic, this level of divergence nevertheless indicates a long period of isolation between subspecies of *C. linchi*, sufficient to consider the Kinabalu population reproductively isolated and to be following an independent evolutionary trajectory. This evidence, combined with significant differences in morphology, indicates that the Kinabalu form should be considered specifically as *Collocalia dodgei*, as originally described by Richmond (1905). We suggest Bornean Swiftlet as an appropriate English name, rather than Kinabalu or Sabah Swiftlet, in view of the possibility that other populations may be discovered on other high mountains on the island (see below).

The recognition of *C. dodgei* adds yet another montane endemic to the list of Bornean birds. Depending on classification (Inskipp *et al.* 1996, Smythies 1999), about 33 of 41 Bornean endemics are montane or submontane in distribution (Sheldon *et al.* 2001: 15). This number includes not only *C. dodgei* but also the forktail, *Enicurus* (*leschenaulti*) *borneensis*,

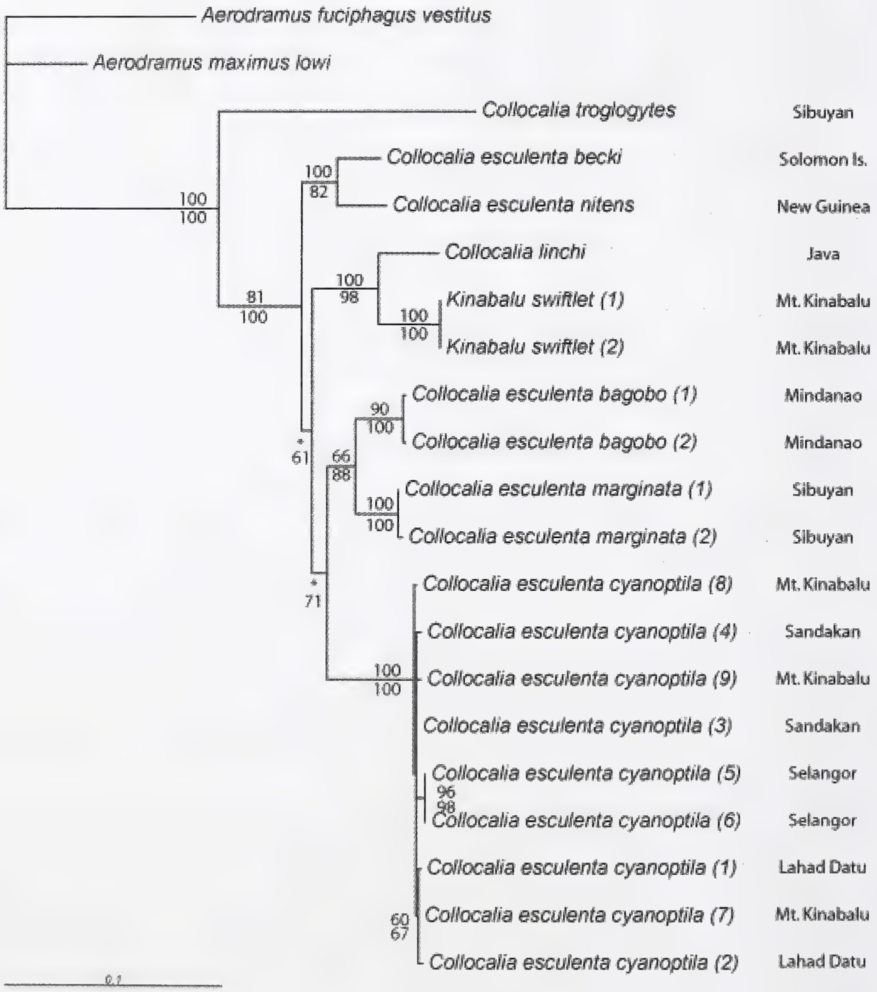
Aerodramus fuciphagus vestitus
Aerodramus maximus lowi
Collocalia troglogytes
Sibuyan
Collocalia esculenta becki
Solomon Is.
Collocalia esculenta nitens
New Guinea
Collocalia linchi
Java
Kinabalu swiftlet (1)
Mt. Kinabalu
Kinabalu swiftlet (2)
Mt. Kinabalu
Collocalia esculenta bagobo (1)
Mindanao
Collocalia esculenta bagobo (2)
Mindanao
Collocalia esculenta marginata (1)
Sibuyan
Collocalia esculenta marginata (2)
Sibuyan
Collocalia esculenta cyanoptila (8)
Mt. Kinabalu
Collocalia esculenta cyanoptila (4)
Sandakan
Collocalia esculenta cyanoptila (9)
Mt. Kinabalu
Collocalia esculenta cyanoptila (3)
Sandakan
Collocalia esculenta cyanoptila (5)
Selangor
Collocalia esculenta cyanoptila (6)
Selangor
Collocalia esculenta cyanoptila (1)
Lahad Datu
Collocalia esculenta cyanoptila (7)
Mt. Kinabalu
Collocalia esculenta cyanoptila (2)
Lahad Datu
100 100
100 82
81 100
100 98
100 100
* 61
90 100
66 88
100 100
* 71
100 100
96 98
60 67
0.1

Figure 1. Maximum likelihood estimate of relationships among *Collocalia* swiftlets based on ND2 DNA sequences. Numbers by nodes refer to maximum likelihood/maximum parsimony bootstrap support. Asterisks or blank nodes indicate bootstrap support less than 50%. Numbers by names refer to Table 1. Branch lengths are proportional to the expected number of substitutions per site, as indicated by the scale bar.

TABLE 2
Wing- and tail-length data condensed from Somadikarta (1986). Values are mean ± standard deviation with the number of individuals in parentheses. All measurements are in mm.

Subspecies	Wing, mean ± SD (*n*)	Tail, mean ± SD (*n*)
dodgei	88.67±1.04 (3)	34.50±1.32 (3)
ripleyi	93.02±3.18 (25)	38.24±1.60 (25)
linchi	94.50±2.00 (77)	41.48±1.45 (58)
dedii	97.19±2.40 (45)	44.25±1.33 (40)

which like *C. dodgei* appears to be most closely related to taxa on Java rather than to lowland counterparts on Borneo (Moyle *et al.* 2005). Further study is likely to reveal close relationships between other Bornean montane taxa and species on the mountains of other Sundaic islands. Such inter-island phylogenetic connections suggest montane taxa were once widespread in the Sundas and that their speciation was caused by island vicariance and montane isolation rather than by intra-island mechanisms, such as displacement by invading species (Sheldon *et al.* 2001) or parapatric ecological separation (Smith *et al.* 1997, Cadena 2007).

BirdLife International (2004) lists *C. linchi* as Least Concern because of its large geographic distribution (Java, Sumatra, Malaya, Bali and other small islands) and common occurrence in some areas. That the Bornean population is a separate species changes this situation. The only known locality for *C. dodgei* (documented by just five specimens) is Mt Kinabalu. The two recent specimens were taken at 2,730 m, and these upper slopes are protected by Kinabalu National Park. However, *C. dodgei* could easily occur on other Bornean mountains that are less protected and studied than Kinabalu. Appropriate habitat, for example, probably exists on nearby high peaks such as Mt Tambuyukon (2,579 m) and Mt Trus Madi (2,649 m). Surveys of the latter (Sheldon & Francis 1985, Moyle & Wong 2002) have found *C. esculenta* as high as 2,100 m, but have not recorded *C. dodgei*. However, swiftlets are notoriously difficult to identify in the field, and no specimens of *Collocalia* have been collected on Trus Madi, so *C. dodgei* could easily have been overlooked. If the species occurs there, or on Mt Tambuyukon, it would be near the summit, where the avifauna is especially poorly known.

Acknowledgements

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Range extension for Marsh Tapaculo *Scytalopus iraiensis* to the highlands of Minas Gerais, Brazil, with an overview of the species' distribution

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Described as recently as 1998, Marsh Tapaculo *Scytalopus iraiensis* is a peculiar, marsh-dwelling Rhinocryptid, apparently unique within the genus in being restricted to such habitat (Bornschein *et al.* 1998, Krabbe & Schulenberg 2003). Part of the *S. speluncae* group, a taxonomically complex assemblage of tapaculos restricted to south-eastern South America, *S. iraiensis* is currently considered Endangered at global and national levels (Machado *et al.* 2005, BirdLife International 2006). Until recently, the species was known solely from a few localities in Paraná and Rio Grande do Sul, southern Brazil (Bornschein *et al.* 1998, 2001, BirdLife International 2000, 2004, Krabbe & Schulenberg 2003, Maurício 2005, Straube *et al.* 2005, Raposo *et al.* 2006). Here, we present the first records of *S. iraiensis* in the highlands of Minas Gerais and review its geographic distribution.

We conducted specific surveys for *S. iraiensis* in Minas Gerais. Vocalisations were tape-recorded using Sony TCM 5000EV, Marantz PMD201 and Panasonic RQ-L31 tape-recorders, and Sennheiser ME-66 and ME-88 microphones. Tape-recordings have been or will be deposited at the Arquivo Sonoro Prof. Elias Coelho (ASEC), Departamento de Zoologia, Universidade Federal do Rio de Janeiro, Brazil. One specimen was collected and deposited in the ornithological collection of the Departamento de Zoologia da Universidade Federal de Minas Gerais (DZUFMG), Belo Horizonte. Voucher specimens of some plants present in marshes where *S. iraiensis* was recorded were deposited in the herbarium of the Departamento de Botânica da Universidade Federal de Minas Gerais (BHCB). We also checked specimens of *S. iraiensis* housed at the Museu de Ciências e Tecnologia, Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre (MCP), Museu Nacional do Rio de Janeiro, Rio de Janeiro (MNRJ), and Museu Paraense Emílio Goeldi, Belém (MPEG).

New records for *S. iraiensis* are presented below. All localities are listed from north to south and are mapped on Fig. 1.

Serra do Cipó (19°15′S, 43°31′W; elevation 1,345 m), Santana do Riacho municipality. On 14–15 September 2006, MFV observed and tape-recorded a single *S. iraiensis* in a marsh beside a stream near Portaria Palácio, in the highest part of Serra do Cipó National Park. Another was heard along the same stream. The marsh comprised predominantly tall grasses (Poaceae), shrubs of Melastomataceae and some Eriocaulaceae.

Sumidouro village, near Fazenda Bocaina (20°00′S, 43°28′W; 730 m), Santa Bárbara municipality. On 25 July 2005, MFV, Santos D'Angelo Neto and Vitor Torga Lombardi observed and tape-recorded one individual in a marsh on the left margin of the rio Caraça. The bird seemed all black and approached to playback several times, but attempts to collect it were fruitless. On 3 August 2005, MFV and José Claúdio Ferreira found another individual in the same marsh, *c.*800 m from the previous sighting. It was collected and prepared as a study skin (DZUFMG 5175). The marsh at Sumidouro comprises secondary vegetation, is subject to fires and disturbance by domestic livestock. Typical plants are: *Sticherus lanuginosus* (Gleicheniaceae), *Lycopodiella camporum* (Lycopodiaceae), *Anemia*

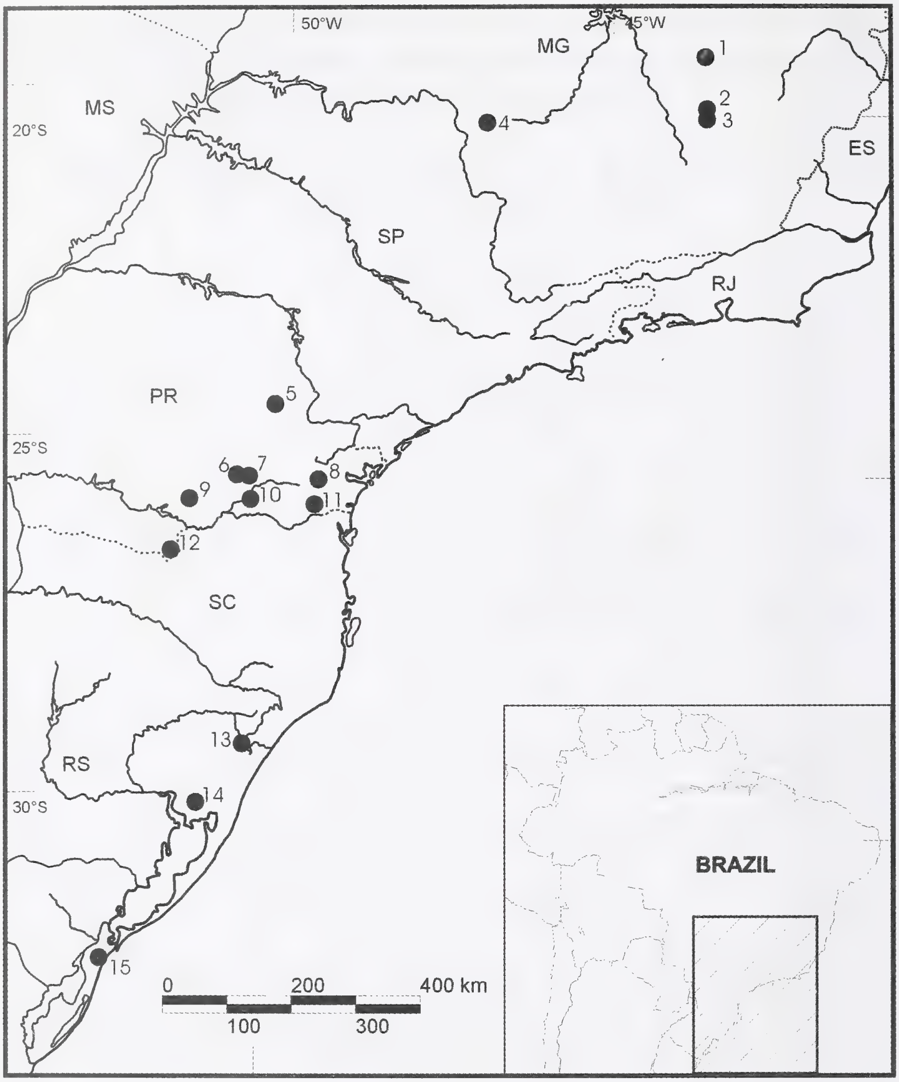

Figure 1. Known sites for *Scytalopus iraiensis*. Minas Gerais: 1 = Serra do Cipó; 2 = Sumidouro village; 3 = Serra do Caraça; 4 = Serra da Canastra. Paraná: 5 = rio Iapó, near Roseta village; 6 = rio das Almas, near Teixeira Soares; 7 = rio Guaraúna; 8 = upper Iguaçu river basin (several nearby localities; see Bornschein *et al.* 2001); 9 = Cruz Machado (three nearby sites; see Straube *et al.* 2005); 10 = São João do Triunfo/Lapa (three nearby localities; see Bornschein *et al.* 2001); 11 = upper rio Várzea basin in Tijucas do Sul (several nearby localities; see Bornschein *et al.* 2001); 12 = Fazenda São Pedro. Rio Grande do Sul: 13 = Aparados da Serra National Park; 14 = Banhado dos Pachecos; 15 = Banhado do Maçarico. Brazilian states shown: Minas Gerais (MG), Mato Grosso do Sul (MS), Espírito Santo (ES), Rio de Janeiro (RJ), São Paulo (SP), Paraná (PR), Santa Catarina (SC) and Rio Grande do Sul (RS).

raddiana (Schizaeaceae), *Thelypteris rivularioides*, *T. serrata* (Thelypteridaceae), *Achyrocline saturioides*, *Baccharis calvescens*, *B. trimera*, *Cosmos sulphureus*, *Sonchus oleraceus*, *Symphiopappus* sp., *Tithonia diversifolia*, *Vernonia brasiliana* and *V. scorpioides* (Asteraceae), *Pyrostegia venusta* (Bignoniaceae), *Cordia* sp. (Boraginaceae), *Commelina oblique* (Commelinaceae), *Ipomoea cairica*, *Jacquemontia* sp., *Merremia macrocalyx* (Convolvulaceae), *Rhynchospora* sp. (Cyperaceae), *Paepalanthus* sp. (Eriocaulaceae), *Chamissice* sp.

(Euphorbiaceae), *Mimosa* sp., *Stylosanthes* sp. (Fabaceae), *Casearia sylvestris* (Flacourtiaceae), *Hyptis* sp. (Lamiaceae), *Buddleja* sp. (Loganiaceae), *Miconia albicans*, *Miconia* sp., *Tibouchina* sp. (Melastomataceae), *Eugenia* sp. (Myrtaceae), three species of *Ludwigia* (Onagraceae), *Cyrtopera longifolia* (Orchidaceae), *Andropogon bicornis*, *Panicum* sp., *Paspalum* sp., *Saccharum* sp. (Poaceae), *Pontederia* sp. (Pontederiaceae), *Borreria* cf. *capitata* (Rubiaceae), *Solanum granuloso-leprosum* (Solanaceae) and *Lippia elegans* (Verbenaceae). GMK *et al.* searched the same locality for the species using playback but without success on 6–7 August 2005, as well as at another ostensibly similar, but at this season rather dry, wetland area *c.*2 km away, south of Sumidouro. However, on 16 October 2005, GMK *et al.* heard at least one *S. iraiensis* singing in the early morning at the marsh adjacent to Fazenda Bocaina.

Serra do Caraça (20°07′–20°08′S, 43°27′–43°31′W; 1,450–1,850 m), Catas Altas and Santa Bárbara municipalities. On 4–6 February 2003, MFV and GNM observed and tape-recorded a single bird in a high-altitude marsh (1,850 m) at the base of Pico do Inficionado, in the Caraça private reserve. Plant species present in this marsh include many native grasses (Poaceae), bamboos such as *Chusquea pinifolia* (Poaceae), tussock grasses *Cortaderia* sp. (Cyperaceae) and many shrubs, including *Tibouchina* sp. (Melastomataceae). On 20 January 2006, the song of another individual was tape-recorded by Luiz Pedreira Gonzaga and Gloria Castiglioni in wet grassland beside a stream flowing into the córrego do Retiro at Campo de Fora (1,450 m).

Serra da Canastra (20°14′–20°28′S, 45°58′–46°26′W; 750–1,415 m), Piumhí and São Roque de Minas municipalities. On 14 August 2005, GMK tape-recorded at least one bird in wet grassland bordering a heavily reed-fringed freshwater lake with much emergent and floating vegetation north of the town of Piumhí (see Vasconcelos *et al.* 2006). None was heard at the same locality on 21 October 2004, 13 October 2005 or 9 October 2006 (GMK pers. obs.). However, on 3 August 2006, LFS and Robson Silva e Silva located at least two birds, one close to the source of the rio São Francisco and another in a marsh near a locality known as 'Curral de Pedras', *c.*3 km distant.

Given the long distance from the previous known range of *S. iraiensis* in southern Brazil, we originally suspected that the population in Minas Gerais might represent a new species. Nevertheless, comparison of the new specimen with the type series corroborated the plumage diagnosis of the original description (Bornschein *et al.* 1998): the combination of blackish upperparts, grey underparts and dark grey flanks distinguish the species from all congenerics. Measurements of the Minas Gerais specimen are within (wing chord: 45.0 mm; tail: 39.4 mm; weight: 13.9 g), or only slightly below (tarsus: 17.4 mm), the range known for *S. iraiensis* (see Maurício 2005). Furthermore, a preliminary analysis of vocalisations made by GNM did not reveal any consistent differences between the populations from southern Brazil and those found in Minas Gerais, though only the song (not calls) is available for the latter. L. P. Gonzaga (*in litt.* 2007) independently concluded the same based on his recordings from the Serra do Caraça. Therefore, we identify the Minas Gerais population as *S. iraiensis* without hesitation, though we recognise that calls may represent a very useful character to address species limits in the *S. speluncae* group (see Maurício 2005).

Given this unusual distribution it seems natural that Marsh Tapaculo should be found in São Paulo state. However, intensive playback searches conducted by LFS and Érika Machado, between late 2005 and March 2007, in the marshes of Mogi das Cruzes, Biritiba Mirim, Salesópolis (including the road to Estação Biológica de Boracéia; *c.*23°39′S, 45°54′W), Estação Ecológica de Itirapina (22°15′S, 47°49′W) and Franca (20°32′S, 47°27′W) were fruitless. Based on personal data from Bianca L. Reinert and Marcos Ricardo Bornschein, who indicated to us the more suitable habitats for Marsh Tapaculo, we searched more than 30 sites without any positive response. Nonetheless, occurrence in São Paulo state can still be expected and areas that still possess large natural fields and marshes, such as Parque Estadual da Serra do Mar, núcleo Curucutu (23°59'S, 46°44'W), on the outskirts of São Paulo city, are candidates to harbour the species.

Overview of the distribution of *Scytalopus iraiensis*

S. iraiensis was described from three wetland localities in the metropolitan area of Curitiba, Paraná (Bornschein *et al.* 1998), and was found subsequently at several new sites in the eastern third of the same state (Bornschein *et al.* 2001). A tapaculo population thought to represent this species was found, in 1998, by Rafael A. Dias and GNM in a coastal marsh in southern Rio Grande do Sul (Fig. 1, no. 15), and was referred to as *Scytalopus* sp. in Bencke (2001) and Maurício & Dias (2001). Based on vocal and specimen data, this population was subsequently confirmed to be *S. iraiensis*, and a new locality for the species in the same state (Fig. 1, no. 14) was also found (Maurício 2005; see also Accordi *et al.* 2003). *S. iraiensis* has also been found in south-central Paraná and north-east Rio Grande do Sul (Straube *et al.* 2005, Bencke *et al.* 2006; Fig. 1). With the exception of sites 14 and 15, which are near sea level, the remaining areas are in the highlands (the Planalto Meridional), at 750–1,100 m.

The new records of *S. iraiensis* reported here are the first for Minas Gerais and extend its known range more than 450 km north. Moreover, the Serra do Cipó lies *c.*850 km north-east of the nearest records in Paraná state. Given this much wider range than previously imagined, it is clearly of value to search for the species elsewhere, not only at intervening localities, e.g. highland marshes and wetlands in São Paulo and Rio de Janeiro states, but also in similar areas of habitat in western Espírito Santo state and even as far afield as north-east Argentina. The very recent discovery of *S. iraiensis* at comparatively well-studied localities in Minas Gerais, e.g. the Serra do Cipó (Melo Júnior *et al.* 2001, Rodrigues *et al.* 2005), Serra do Caraça (Vasconcelos 2001, Vasconcelos & Melo Júnior 2001, Vasconcelos *et al.* 2003, Faria *et al.* 2006) and Serra da Canastra (Silveira 1998), underlines the importance of species-specific searches which initially seek to locate prime habitat and thereafter use rigorous playback trials in such areas, to locate this (and other) birds easily overlooked by more general avifaunal surveys, even when conducted by highly competent observers. Furthermore, notwithstanding that the species appears to share with *S. pachecoi* a (primarily naturally rather than man-influenced) disjunct distribution, *S. iraiensis* is also likely to be present at more sites within the amplified range described here.

It is important to note that most of the range of *S. iraiensis* is adequately documented by physical evidence, including the records from the northernmost localities in Minas Gerais, as reported here (tape-recordings from all four sites and a specimen from one of them), and the southernmost records obtained in Rio Grande do Sul (several tape-recordings from two lowland localities and two specimens from one of these; Appendix) (Maurício 2005; see also Bornschein *et al.* 1998).

Despite having a much wider range than previously admitted (e.g. Krabbe & Schulenberg 2003), we do not propose any change to the current IUCN threat category Endangered for *S. iraiensis*, for the following reasons. The wetlands of the southernmost Brazilian states, especially those of the Planalto highlands, as well as those where the species has been found in Minas Gerais are being constantly altered by a dangerous, non-natural fire regime, and in southern Brazil several new projects are draining small and medium-sized marshes. The range of *S. iraiensis*, at least in part, is naturally patchy and several of its populations are probably effectively isolated (i.e. lack gene flow). For example, the two populations of coastal Rio Grande do Sul are separated by more than 200 km; no marsh in the intervening region appears to support a habitat structure, i.e. tall marsh vegetation with extremely dense undergrowth of grasses and other plants, capable of harbouring *S. iraiensis*. This is particularly significant considering that *Scytalopus* are poor dispersers (Krabbe & Schulenberg 2003).

Finally, we highlight that the records from three protected areas (Caraça private reserve, Serra do Cipó National Park and Serra da Canastra National Park) are very important for this threatened species, as so few sites are within such areas (BirdLife International 2000, 2004, 2006, Bencke *et al.* 2006).

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APPENDIX

Material examined—skins:

Brazil. Minas Gerais: Sumidouro, Santa Bárbara (*n*=1) (DZUFMG 5175 [male]). Paraná: right bank of the rio Iraí, Quatro Barras (*n*=5) (MNRJ 43378—holotype [female], MNRJ 43379—paratype [male], MNRJ 43380—paratype [male], MPEG 52944—paratype [female], MPEG 52945—paratype [male]). Rio Grande do Sul: Banhado do Maçarico, Rio Grande (*n*=2) (MCP 957 [male], MCP 958 [male]).

Material examined—tape-recordings:

Brazil. Minas Gerais: Pico do Inficionado, Serra do Caraça, Catas Altas, song (*n*=3, from the same individual); Sumidouro, Santa Bárbara, song (*n*=1); Portaria Palácio, Serra do Cipó, Santana do Riacho, song (*n*=1). Rio Grande do Sul: Banhado do Maçarico, Rio Grande, song (*n*=6, representing four individuals [including MCP 958]), and call (several samples from the same individual); Banhado dos Pachecos, Viamão, song (*n*=2, from two birds).

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Field evidence for the validity of White-tailed Tityra *Tityra leucura* Pelzeln, 1868

by Andrew Whittaker

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Tityra leucura (White-tailed Tityra) was described by Pelzeln (1868) from a specimen collected by J. Natterer, on 8 October 1829, at Salto do Girao [=Salto do Jirau] (09°20′S, 64°43′W) *c.*120 km south-west of Porto Velho, the capital of Rondônia, in south-central Amazonian Brazil (Fig 1). The holotype is an immature male and is housed in Vienna, at the Naturhistorisches Museum Wien (NMW 16.999). Subsequent authors (Hellmayr 1910, 1929, Pinto 1944, Peters 1979, Ridgely & Tudor 1994, Fitzpatrick 2004, Mallet-Rodrigues 2005) have expressed severe doubts concerning this taxon's validity, whilst others simply chose to ignore it (Sick 1985, 1993, 1997, Collar *et al.* 1992.). Almost 180 years have passed since its collection with the result that *T. leucura* has slipped into oblivion, and the majority of Neotropical ornithologists and birdwatchers are unaware of its existence.

Here, I review the history of *T. leucura* and then describe its rediscovery from the rio Madeira drainage of south-central Amazonian Brazil, providing details of my field observations of an adult male. I present the first published photographs of the holotype of *T. leucura*, and compare plumage and morphological differences with two similar races of Black-crowned Tityra *T. inquisitor pelzelni* and *T. i. albitorques. T. inquisitor* specimens were examined at two Brazilian museums for abnormal plumage characters. I also discuss the taxonomic history of *T. leucura* and the reasons that led to it being placed in the synonymy of *T. inquisitor*. Finally, I summarise my rationale for why *T. leucura* should be treated as valid.

History of *Tityra leucura*

Hellmayr (1910, 1929) was first to cast doubts on the validity of *T. leucura* stating that 'the type, a male molting from the juvenile into the first annual plumage, is most nearly related to *T. i. albitorques* and resembles it in the white cheeks and auricular region; but the upper parts and breast are much more strongly tinged with gray, without any white on the hind neck, and the tail lacks the black subterminal band. The rectrices are pale gray, with the base of the inner webs white for about twenty millimeters (as in *T. i. inquisitor*), and the tips broadly, although not abruptly, margined white. The outermost pair shows a narrow blackish shaft streak in the second third of the inner web, and a similar, but smaller spot exists near the base of the central rectrices. The coloration of the tail gives an abnormal impression, and may be due to the absence of melanin in the pigment cells during the process of growth. The bill, too, appears to have been retarded in its development. It is only one-third the size of the allied species and, instead of black, dark horn brown, paler below. The top of the head is mainly black, with slight metallic gloss, though on the forehead, superciliary region, and the hind crown a number of the hazel brown juvenile feathers may yet be seen. The second primary, as is also the case in the first annual plumage of the allied species, is fully developed and very nearly as long as the third. Concluding, additional material is required to establish the status of this alleged species." Thereafter, the status of *T. leucura* was consistently regarded as dubious; J. T. Zimmer (*in* Traylor 1979) concluded 'Its described characters suggest the possibility of abnormality in a subadult that is intermediate between *T. i. albitorques* and *T. i. pelzelni*, whose ranges involve other sections of the rio Madeira and its effluents'. More recently, Ridgely & Tudor (1994) noted *T. leucura* as a dubious species, given the lack of field records and that geographic variation in the tail colour of *T. inquisitor* exists (the individual could be merely abnormal in showing a white tail). Fitzpatrick (2004) followed previous work in considering the type to be an abnormal subadult male, intermediate between *T. i. albitorques* and *T. i. pelzelni*, whose ranges apparently overlap in the area where the holotype was collected. Finally, Mallet-Rodrigues (2005) stated that either the type represents individual variation or is an intermediate between two geographical forms of *T. inquisitor*.

Methods

I undertook 50 days of field surveys at Pousada Rio Roosevelt (08°29'S, 60°57'W; Fig. 1), during five visits, 10–21 April 2004, 7–17 September 2004, 12–20 March 2005, 1–9 April 2006 and 11–19 September 2007. Field work was concentrated in lowland humid forest *c*.10 km either side of the pousada along the rio Roosevelt and *c*.10 km upstream on the rio Maderinha. A single excursion was made to the mouth of the rio Machadinho. Observations were made along riverbanks (from boats), on foot in *terra firme* forest and at the edge of the lodge's airstrip. Results of this work will be published elsewhere (Whittaker submitted).

I examined specimens of *T. inquisitor* at the Museu de Zoologia da Universidade de São Paulo, Brazil (MZUSP) and Museu Paraense Emílio Goeldi, Belém, Pará, Brazil (MPEG), as follows: *T. i. inquisitor* (MPEG 18955–56, 27219–21, 38414, 41273, 41495, 43493–94, 44594–95, 45285–86, 47109, 49090–91, 51853–54, 52433; MZUSP 1624, 5420, 6314, 6710–11, 8190–92, 10079, 12119, 12125, 15089, 15091, 15773, 26075, 26201, 27817, 28242–43, 28686–87, 30394, 31262, 31907, 33475–76, 36954, 40998–99, 43237, 48085–87, 50089–90, 51163–64, 51238, 51895, 52723, 54562, 54582, 56923, 56925–27, 68681–84, 72286, 72288, 74054, 74711, 75325, 76076); *T.*

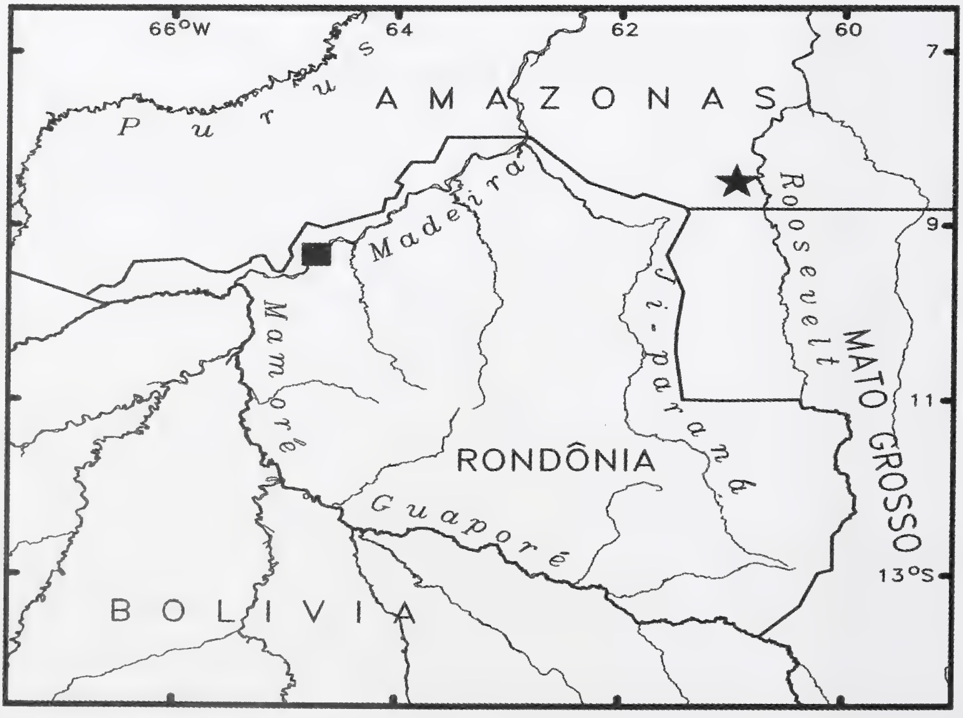


Figure 1. Map showing the type locality of *Tityra leucura* (square), at Salto de Jirau, Rondônia, and the rediscovery site (star), at Pousada Rio Roosevelt, Amazonas (prepared by Mort Isler).

i. erythrogenys (MPEG 2623–24, 9256, 15222, 27222, 46057–58); *T. i. pelzelni* (MPEG 27223; MZUSP 23393, 30393, 30395–96, 32688, 52722); and *T. i. albitorques* (MZUSP 5246, 23399).

Rediscovery

I observed a presumed adult male *T. leucura*, at 15.15 h on 6 April 2006, in low-stature (*c*.20–30 m) *terra firme*, while following a huge midstorey mixed-species flock of insectivores. My initial impression was of an odd-looking *Tityra* with a striking all-white tail. It was immediately obvious that the bird was unlike any other tityra species (i.e. Black-tailed Tityra *T. cayana*, Masked Tityra *T. semifasciata* and Black-crowned Tityra *T. inquisitor*), all of which I know extremely well, and I therefore strongly suspected that my observation might represent the rediscovery of the *T. leucura* phenotype.

I carefully observed the bird for seven minutes as it followed the flock, the sunny conditions affording perfect viewing conditions, at *c*.50–70 m. Close observation of the tail at various angles confirmed that all of the rectrices were white, with no trace of black. I also noted the following distinct plumage characters. The bird most closely resembled *T. inquisitor*, but the black crown appeared reduced and did not reach the nape, running from the lores to just below the eye, then wrapping around the pure white ear-coverts (as in *T. i. albitorques*) and onto the rear crown. The upperparts were whitish grey, whilst the black flight-feathers offered a sharp contrast. I also gained the strong impression of the bird possessing a smaller bill, making its jizz somewhat more reminiscent of a *Pachyramphus* becard. The bill was dark above with a distinctly paler maxilla; the legs were dark and irides dark brown or black. For a couple of minutes, I followed the tityra with my microphone and tape-recorder switched on, in the forlorn hope of recording its voice. Once the bird was lost from view, I swiftly returned to the lodge to round up my birding group, whereupon we returned to the area of the sighting with cameras. However, we were unsuccessful in relocating the bird.

Behaviour.—The tityra associated with a huge mixed-species flock, which included Violaceous Trogon *Trogon violaceus*, Squirrel Cuckoo *Piaya cayana*, White-fronted Nunbird *Monasa morphoeus*, Buff-throated Woodcreeper *Xiphorynchus guttatus*, Cinnamon-throated Woodcreeper *Dendrexetastes rufigula*, Olivaceous Woodcreeper *Sittasomus griseicapillus*, Chestnut-winged Foliage-gleaner *Philydor erythropterus*, Slender-billed Xenops *Xenops tenuirostris*, Sclater's Antwren *Myrmotherula sclateri*, Chestnut-shouldered Antwren *Terenura humeralis*, Grey Elaenia *Myiopagis caniceps*, Forest Elaenia *M. gaimardii*, Yellow-margined Flycatcher *Tolmomyias assimilis*, Grey-crowned Flycatcher *T. poliocephalus*, Ruddy-tailed Flycatcher *Terenotriccus erythrurus*, Tooth-billed Wren *Odontorchilus cinereus*, Red-eyed Vireo *Vireo olivaceus*, Buff-cheeked Greenlet *Hylophilus muscicapinus*, White-

TABLE 1

Comparison of bill sizes of *Tityra leucura* with *T. i. pelzelni* and *T. i. albitorques*. Length = exposed culmen (in mm). All measurements taken by E. Bauernfeind.

Taxon	**specimen no.**	**sex**	**length**	**gape**
T. i. pelzelni	NMW 16.996	male	21.5	13.6
	NMW 16.997	female	21.5	11.9
	NMW 16.998	juvenile female	20.4	11.6
T. i. albitorques	NMW 16.994	male	21.4	13.4
	NMW 16.995	female	[19.2]*	12.4
T. leucura	NMW 16.999	juvenile male	14.6	10.2

* tip broken

winged Shrike-Tanager *Lanio versicolor* and Paradise Tanager *Tangara chilensis*. The tityra behaved typically, being sluggish, perching (often on open horizontal boughs) essentially motionless, albeit moving its head to slowly peer around. It hopped lethargically along horizontal branches, sometimes searching denser clumps of leaves or along larger branches for prey. The bird spent most time in the midstorey, and only once ventured to the subcanopy.

Comparison with the holotype

My field description of a tityra with a pure white tail, white cheeks and proportionately smaller bill than congeners, which was not entirely dark, clearly matches the diagnostic features of *T. leucura* described by Pelzeln (1868). After reviewing photographs of the holotype (Figs. 2–7), I was in no doubt that my observations referred to a male *T. leucura*. However, unlike the holotype, (an immature male), my observation clearly involved an adult male.

Biometrics.—The bill of *T. leucura* is strikingly different in size to allied taxa (Table 1), but wing- and tail-lengths are similar. The bill of *T. leucura* is dark reddish brown (upper mandible) and pale amber, mottled darker brown on the edges (lower mandible) (E. Bauernfeind *in litt*. 2007). Compared to *T. i. pelzelni* and *T. i. albitorques*, the bill of *T. leucura* is much paler, although the base of the lower mandible in one *T. i. pelzelni* (presumably an immature; NMW 16998) was slightly paler, as in *T. leucura*. In *T. i. pelzelni* and *T. i. albitorques* the hook at the bill tip is stronger and very well defined in adults.

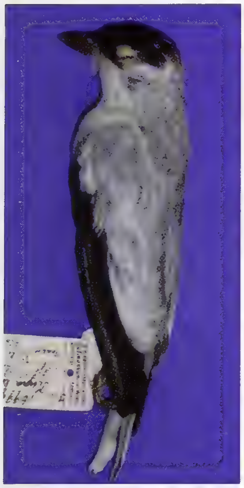
Plumage diagnostics.—Compared to *T. leucura*, in *T. i. pelzelni* the black crown extends slightly further onto the nape, as well as onto the cheeks and ear-coverts, which are white in *T. leucura* (Fig. 6). The rectrices are white basally with a broad black bar and very distinct white apical margin, but are all white in *T. leucura* (Fig. 5). *T. i. pelzelni* has a proportionately larger, darker bill than *T. leucura* (Fig. 6). *T. i. albitorques* has a white tail with a broad black subterminal band of *c*.20 mm, and white apical margin, as well as a more extensive black crown than *T. leucura*, whilst its bill is again proportionately much larger and all dark (Figs. 5–7).

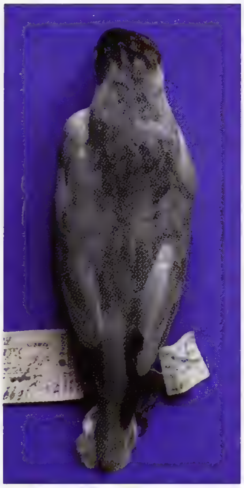
Status.—The lone record of *T. leucura* at Pousada Rio Roosevelt was made during four separate research trips, totalling 50 days. If *T. leucura* is a valid taxon then this tityra must be a very low-density inhabitant of the midstorey and canopy of Amazonian forest, as is *T. inquisitor* (Stotz *et al*. 1997, Zimmer *et al*. 1997; AW unpubl.).

Taxonomic doubts

I summarise the reasons put forward for doubting the validity of *T. leucura*, and explain my rationale for contradicting each theory and for considering *T. leucura* as probably worthy of taxonomic status.

Hybrid theory.—This theory proposed that *T. leucura* represents a hybrid between *T. i albitorques* and *T. i. pelzelni*, with an all-white tail. It is difficult to comprehend how such a pairing would result in a bird with a pure white tail, given that both races possess broad black tail-bands with smaller amounts of white. Although there is variation in tail patterns of those taxa in *T. inquisitor*, each tail pattern appears constant, with no variation (AW pers. obs.). For instance, my comparison of specimens at MZUSP, involving 56 *T. i. inquisitor*, six *T. i. pelzelni* and two *T. i. albitorques* revealed consistent patterns with no signs of abnormality or intra-taxon variation. Furthermore, *T. i. pelzelni* has all-black ear-coverts, making it even harder to explain why a supposed hybrid would possess both white auriculars and a white tail.





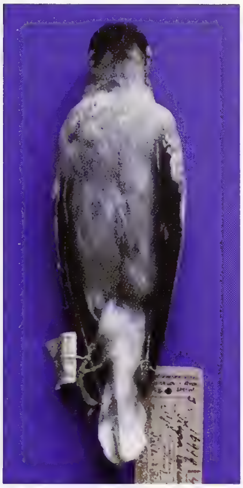


Figure 2 (left). Lateral view of the holotype of White-tailed Tityra *Tityra leucura* (E. Bauernfeind)

Figure 3 (middle). Dorsal view of the holotype of White-tailed Tityra *Tityra leucura* (E. Bauernfeind)

Figure 4 (right). Ventral view of the holotype of White-tailed Tityra *Tityra leucura* (E. Bauernfeind)

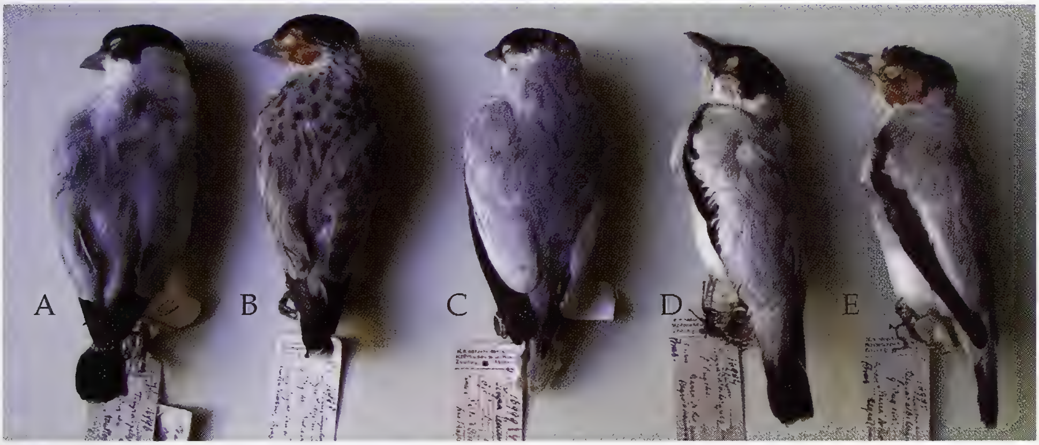
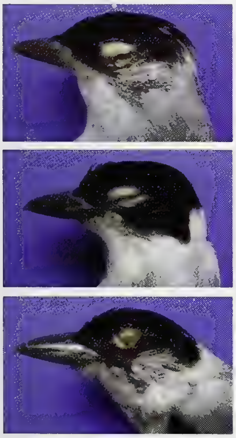


Figure 5. Dorsal view of males and females of Black-crowned Tityra *T. inquisitor pelzelni* (A and B) and *T. i albitorques* (D and E), compared to the male holotype of White-tailed Tityra *T. leucura* (C) (E. Bauernfeind)



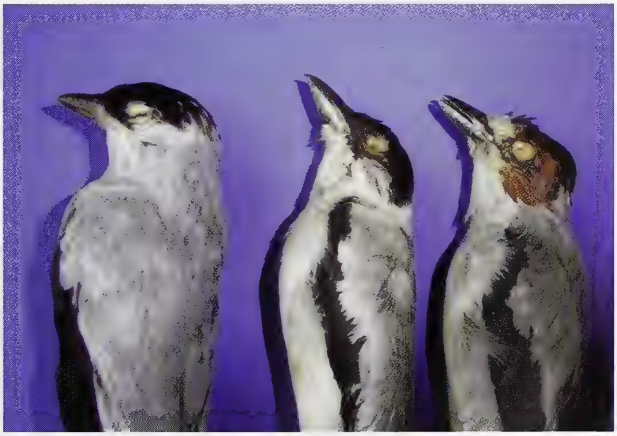


Figure 6 (left). Head views of the holotype of White-tailed Tityra *T. leucura* (top) and Black-crowned Tityra *T. inquisitor pelzelni* (middle) and *T. i. albitorques* (bottom) (E. Bauernfeind)

Figure 7 (right). Lateral view of the holotype of White-tailed Tityra *Tityra leucura* (left) compared to male (middle) and female Black-crowned Tityra *T. i. albitorques* (E. Bauernfeind)

Lack of melanin in the tail.—That I was unable to find any unusual variation in the tail pattern of the 64 tityra specimens studied at MZUSP, combined with the fact that no such variation appears to have been documented elsewhere, does not support this theory. Of course, any bird species could lack melanin in its tail, but the probability of this event occurring twice in a tityra in the same biogeographical region, and apparently nowhere else, appears extremely unlikely.

Abnormally small bill.—This factor could be due to the type being juvenile and the bill retarded in its development. Admittedly, some juveniles fledge with smaller bills than adults, making this theory not instantly dismissible, but my field observation also suggested that the bill (of an adult male) is smaller than other tityras. The smaller bill of *T. leucura* is obvious (Fig. 6) when compared directly with *T. i. albitorques* and *T. i. pelzelni*, and mensural data confirm this (Table 1). Since Hellmayr (1910, 1929), this striking morphological feature has been overlooked or missed by all subsequent commentators.

Remarks

The type locality of *T. leucura* lies in the same biogeographical area as the rediscovery site, which is *c*.420 km to the east-northeast. The rio Roosevelt flows north into the rio Aripuaná, which drains into the rio Madeira, one of the four major south-bank tributaries of the lower Amazon. The Madeira forms a major biogeographical barrier to many birds, animals and plants (Haffer 1992). Some 300–350 km further to the east is the rio Tapajós, which constitutes another major barrier to species distributions. The area of land between them, the Madeira/Tapajós interfluvium (where *T. leucura* occurs) is well known as one of the main centres of endemism (in birds) in the southern Amazon basin, being located within a proposed Pleistocene refugium, known as the 'Rondônian area of endemism' (Haffer 1974, Cracraft 1985). This area is still producing a wealth of scientific discoveries, including the recently described Rondônia Bushbird *Clytoctantes atrogularis* (Lanyon *et al*. 1990) from Cachoeira Nazaré, Rondônia, just *c*.120 km south-west of Pousada Rio Roosevelt.

Despite this, very little ornithological collecting, or research, has been undertaken in the Madeira/Tapajós interfluvium, leaving the region's avifauna extremely poorly known. Natterer collected along the rios Madeira and Guaporé (Pelzeln 1868–70), the Hoffmanns worked the lower rio Jiparaná and rio Madeira (Hellmayr 1910), and, recently, MZUSP and Field Museum of Natural History (FMNH), Chicago, staff made a major collection on the middle rio Jiparaná (Stotz *et al*. 1997). Reviews of avian collecting in the Brazilian Amazon, by Haffer (1974) and Oren & Albuquerque (1991), have confirmed its highly uneven pattern, with most localities, unsurprisingly, being along major rivers, and little penetration of the vast interfluvial interiors. Detailed analysis of all Brazilian Amazonia collecting sites (>100 specimens) by Oren & Albuquerque (1991) confirmed that areas of thousands of square kilometres are completely unsampled, and well over 50% of the region is still a major priority for collecting work. Concluding, Oren & Albuquerque (1991) stated 'the entire southern tier of the Brazilian Amazon from Acre and Rondônia remains virtually unknown'.

Conclusion

There are no scientific grounds or strong reasons to consider *T. leucura* a synonym of *T. inquisitor*. Given that the entire region remains extremely poorly known ornithologically, it is scarcely surprising that a forest canopy inhabitant like *T. leucura* should have gone overlooked for 177 years. My observation of an adult male tityra matching the description of *T. leucura* strongly suggests that *T. leucura* is a valid taxon, presumably restricted to the Madeira/Tapajós interfluvium and a Rondônian endemic, and should promote immediate research into its taxonomy. Fortunately, a more detailed study of possible leucism and a comparison of the type with allied taxa are underway (Bauernfeind in prep.), whilst a genetic comparison of *T. leucura* and other *Tityra*, especially *T. inquisitor*, if possible, is also much-needed. For now, *T. leucura* should be considered Data Deficient on the IUCN/BirdLife International Red Data list.

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For his suggestions and the photographs, I am extremely indebted to Dr Ernst Bauernfeind (NMW). I dedicate this paper to the memory of Paul Coopmans whose untimely death was a great loss to Neotropical ornithology. Waner Costa not only permitted my research at Pousada Rio Roosevelt, but has also had the wonderful foresight to protect this very special region through his wonderful lodge for sport fishermen and ecotourists. Alex Lees and Edson Endrigo shared unpublished data and Mort Isler created the map. Francisco Mallet-Rodrigues, Marcos Raposo and Guy Kirwan made helpful comments from which the manuscript benefited. I am very grateful to both Alex Alexio and Luís Fábio Silveira for kindly allowing my work at MPEG and MZUSP, and to Marco Antônio Regos, who helped analyse specimens. I especially thank the staff and guides at Pousada Rio Roosevelt for the logistical support that made my visits so productive and enjoyable.

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Corrections and additions to an annotated checklist of birds of the upper rio Urucu, Amazonas, Brazil

by Andrew Whittaker, Alexandre Aleixo & Fabíola Poletto

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Shortly after publication of the paper 'Annotated checklist of the bird species of the upper Rio Urucu, Amazonas, Brazil' (Peres & Whittaker 1991), AW became aware that several important records therein were erroneous. Various communications questioning the credibility of some records in Peres & Whittaker (1991) led him to undertake a thorough review of all data presented. Subsequently, an updated bird list was prepared for the area, combining all valid records by Peres & Whittaker (1991) as well as those made by AA, FP and M. P. D. Santos since 2003 (Aleixo *et al.* in press). Here we correct errors in Peres & Whittaker (1991), mostly misidentifications (many of them unnecessarily included and easily avoided); reinforce and expand on records whose importance was previously overlooked; correct the identity of species listed as uncertain; update taxonomy; and add important new data.

Research dates

AW's contributions to the checklist in Peres & Whittaker (1991) were gathered during a seven-day period of mist-netting and observations, on 28 December 1988–3 January 1989 (with Nadime Araújo Whittaker). AA and FP undertook research at the Urucu under the CT-Petro project, for a total 41 days as follows: 18 June–9 July 2003, 7–20 September 2004 and 29 September–5 October 2006; they surveyed birds at several sites (mostly in *terra firme* and creek-side forests) through observations, tape-recordings, mist-netting and collecting. Specimens are deposited in the Museu Paraense Emílio Goeldi, Belém, Brazil (MPEG).

Identification errors and uncertainties

RED-WINGED WOOD RAIL *Aramides calopterus*
This extremely poorly known species was noted by Peres, who supposedly identified it by voice, in creek-side forest along the rio Urucu, although elsewhere vocalisations of *A. calopterus* are considered unknown (Vaca *et al.* 2006). We believe this record should be withdrawn until evidence is presented to show that the much commoner Grey-necked Wood Rail *A. cajanea*, also found at the Urucu in the same habitat (Peres & Whittaker 1991; AA & FP pers. obs.), was not involved. The only confirmed Brazilian record of *A. calopterus* is from the upper rio Juruá (Gyldenstolpe 1945). A record reported by Stotz & Bierregaard (1989) from *terra firme* north of Manaus, Amazonas (east of the rio Negro), was later considered erroneous (Cohn-Haft *et al.* 1997).

RUDDY GROUND DOVE *Columbina talpacoti*
Reported as uncommon and associated with anthropogenic habitats at the Urucu (Peres & Whittaker 1991), but probably in error for Common Ground Dove *C. passerina*, the only ground dove recorded by AA & FP, who collected an adult male (MPEG 56994). *Columbina* populations presumably became established following intensive occupation and widespread habitat disturbance along the main road traversing the area, in the late 1980s. As C.

passerina is the only ground dove observed frequently and documented for the Urucu, we recommend removing *C. talpacoti* from the checklist for now.

CANARY-WINGED PARAKEET *Brotogeris versicolurus*
AA & FP observed Cobalt-winged *B. cyanoptera* (also tape-recorded) and Golden-winged Parakeets *B. chrysoptera chrysosema* (also tape-recorded and collected [MPEG 56993]), apparently the first documented sympatry between these species. Records of *B. chrysoptera* at the Urucu represent a significant range extension, west across the rio Madeira (Collar 1997). As *B. c. chrysosema* exhibits distinct bright yellow primary-coverts (and was not expected in the Urucu area), it might have been confused with *B. versicolurus*. Nonetheless, the extensive white mixed with yellow on the wing (very noticeable in flight) and longer tail of *B. versicolurus* should have prevented this error. At the Urucu, *B. chrysoptera* is outnumbered by the commoner *B. cyanoptera*, but is often found in small flocks in *terra firme* edge, mainly around 'Papagaio' lodge (04°51'S, 65°04'W). In contrast, *B. versicolurus* is a *várzea* species, occurring mostly along the Amazon (Aleixo & Poletto 2007), making it unlikely to occur so far from the Amazon's main channel. We recommend removing *B. versicolurus* from the list. Further field work in south-west Amazonian Brazil should reveal whether other populations of *B. c. chrysosema* exist west of the Madeira.

RED-LORED PARROT *Amazona autumnalis*
This large *Amazona* is represented in Amazonian Brazil by the isolated and distinct population *A. a. diadema*, known only from the lower rio Negro basin and adjacent north bank of the Amazon to Barra do Rio Negro, in north-west Brazil (Collar 1997). The report of *A. autumnalis* as common at the Urucu (Peres & Whittaker 1991) represents the only known record south of the Amazon. AA and FP's surveys recorded only two *Amazona*: Yellow-crowned Parrot *A. ochrocephala* and Mealy Parrot *A. farinosa*; both were documented with tape-recordings. As *A. ochrocephala* is not listed by Peres & Whittaker (1991), it seems possible that records of *A. autumnalis* in fact refer to the former. Although *A. a. diadema* is documented to undertake seasonal movements from *terra firme* north of Manaus (Cohn-Haft *et al*. 1997; AW pers. obs.), with records as far as the west bank of the rio Negro in Jaú National Park (Borges *et al*. 2001), we prefer to regard this unique record of *A. autumnalis* as a misidentification and remove it from the list.

LESSER NIGHTHAWK *Chordeiles acutipennis*
January records presented in Peres & Whittaker (1991) must have referred to the similar Common Nighthawk *C. minor*, which is present during this period in Amazonia, and was observed by AW in December 1988 at the Urucu. On 30 September 2006, AA & FP observed a flock of *c*.30 *C. minor* flying high over the rio Urucu at dusk. Most records of *C. minor* in Amazonia occur during autumn migration, with few after December (Stotz *et al*. 1992). However, on 28 December 2006, AW observed a feeding congregation of 150+ *c*.7 km south of Presidente Figueiredo, Amazonas, and G. M. Kirwan (*in litt*. 2008) and H. Shirihai saw >100 leaving a roost at Iracema Falls, north of Presidente Figueiredo, on 14–15 December 2007. The only spring records of *C. minor* from Amazonia are by M. Cohn-Haft: three on 15–16 March 1989 at the Manaus INPA tower and large numbers during the first half of April 1989 at the Urucu (Stotz *et al*. 1992). *C. acutipennis* arrives later in Amazonia (March–April; AW pers. obs.), as do most austral migrants, by which time *C. minor* is very rare in the region. Because the only *Chordeiles* consistently observed at the Urucu is *C. minor*, and identification demands careful study of wing pattern, tail length and subtle differences in flight pattern, we recommend removing *C. acutipennis* from the list.

WHITE-CHINNED JACAMAR *Galbula tombacea*

Reported by Peres & Whittaker (1991) as common in forest edge, along roads and creek-side forest, but this must refer to the similar and closely related Bluish-fronted Jacamar *G. cyanescens*, its geographic replacement in south-west Amazonia (Haffer 1974). AA & FP recorded *G. cyanescens* very frequently, mostly in creek-side forest, where two adult males were collected, in 2003 and 2004 (MPEG 56992, 58291).

***NYSTALUS* SP.**

Peres *in* Peres & Whittaker (1991) reported an unidentified puffbird, undoubtedly of the genus *Nystalus*, being most similar to 'Barred Puffbird *Nystalus striolatus*'. However, the correct English name of *N. striolatus* is Striolated Puffbird, not Barred Puffbird *N. radiatus*, which is found only in western Colombia and western Ecuador (Ridgely & Greenfield 2001). The field description by Peres certainly does not exactly fit any known puffbird, but is fairly close to *N. striolatus*, which we believe these birds must have been. Subsequently, AA & FP collected four *N. striolatus* at the Urucu, in 2003 and 2004 (MPEG 56996–98, 58289). Pairs and even small groups were frequently observed perched on wires beside the main road, particularly along the main creeks. *N. striolatus* is fairly common, particularly in creek-side forest, being especially vocal at dawn.

BLACK-NECKED ARAÇARI *Pteroglossus aracari*

South of the Amazon in Brazil, the range of *P. aracari* terminates well east of the Urucu, at the right bank of the rio Madeira (Short & Horne 2002). Thus, the Urucu record of *P. aracari*, where it was reported as uncommon in *terra firme* (Peres & Whittaker 1991), is more than 500 km west of its range, within a different centre of endemism. We therefore conclude that this entry must refer either to the similar Chestnut-eared Araçari *P. castanotis* (not recorded subsequently by AA & FP) or Brown-mandibled Araçari *P. azara* (five specimens obtained by AA & FP: MPEG 57012–57014, 58293, 61155). As all three are similar, especially *P. aracari* and *P. castanotis*, they can be misidentified. For example, the diagnostic chestnut ear-coverts of *P. castanotis* (vs. black in *P. aracari*) are easily overlooked in the field, except in perfect light (AW pers. obs.), regularly leading to confusion, e.g., at Alta Floresta, Pará (AW unpubl.). The known range of *P. castanotis* does include the Urucu (Short & Horne 2002), but given that AA & FP did not record it, we believe it best to regard the Peres & Whittaker (1991) records of *P. aracari* as misidentified *P. azara*. Future field work should reveal if *P. castanotis* also occurs.

LAFRESNAYE'S PICULET *Picumnus lafresnayi*

Reported by Peres & Whittaker (1991) as common in many different habitats at the Urucu, the first records south of the Amazon and a considerable range extension (Winkler & Christie 2002). However, the Urucu is within the known range of Bar-breasted Piculet *P. aurifrons* (Winkler & Christie 2002), which was collected by AW at Caitaú-Uará, Amazonas, *c.*240 km to the north-west (MPEG 49891–92); the two specimens possess mixed characters of the *flavifrons* and *purusianus* subspecies (Winkler & Christie 2002). We consider it best to await specimen confirmation of the identity of the Urucu piculet and, until then, it should be listed as *Picumnus* sp.

LITTLE WOODPECKER *Veniliornis passerinus*

Peres & Whittaker (1991) reported it as uncommon in *terra firme*, whereas Red-stained Woodpecker *V. affinis* was common. The only *Veniliornis* in *terra firme* in Amazonian Brazil south of the Amazon is *V. affinis*. To date, no *terra firme* sites in Amazonia hold more than one species of *Veniliornis*, to our knowledge. Furthermore, in Amazonian Brazil *V. passerinus* is restricted to second growth beside rivers and on river islands. Distinguishing these two woodpeckers in the field can be problematic, especially given racial variation (AW pers. obs.). Furthermore, this genus generally spends much time in the midstorey and canopy, within fast-moving mixed-species flocks, making them often difficult to identify. We conclude that *V. passerinus* was a misidentification and should be removed from the Urucu checklist.

PYGMY/MOUSTACHED ANTWREN *Myrmotherula brachyura/obscura*
Identification as Pygmy Antwren *M. brachyura* was established by AW in 1988 and reconfirmed by AA & FP, who observed and tape-recorded this species during every visit to the Urucu, but were unable to find *M. obscura*, whose known range lies further west (AA & AW pers. obs.).

RUFOUS-WINGED ANTWREN *Herpsilochmus rufimarginatus*
Reported for the Urucu based on a sight record by Peres at a canopy platform (Peres & Whittaker 1991). AA and FP failed to find any *Herpsilochmus* there, except a new taxon being described by M. Cohn-Haft, which they documented through tape-recordings and a male specimen (MPEG 61157). However, the new taxon's phylogenetic affinities are probably closer to another species group, rather than *H. rufimarginatus*. Because the Urucu record of *H. rufimarginatus* is the only one from this interfluvium, and the nearest record is *c*.570 km south-east across the Madeira, at Pousada Rio Roosevelt, Amazonas (Whittaker submitted), we recommend removing it from the list due to the likelihood of confusion with the new *Herpsilochmus* mentioned above. Furthermore, AW also obtained tape-recordings of this new taxon, in November 2007, at Reserva de Desenvolvimento Uakarai, on the middle rio Juruá, (05°26'S, 67°17'W), only *c*.230 km to the south-west.

STRIATED ANTBIRD *Drymophila devillei*
We conclude this species' entry was an error, as it was recorded as common in forest gaps and creek-side forests. This antbird is a bamboo specialist, always found in close association with bamboo, particularly *Guadua* species (Parker *et al*. 1997; AW & AA pers. obs.). The complete lack of bamboo at the Urucu reinforces our argument. AA and JP did not find *D. devillei* there, but *D. d. devillei* was tape-recorded and collected (MPEG 50005) by AW at Caitaú-Uará, from bamboo in *várzea* on the south bank of the rio Solimões, *c*.240 km to the north-west. Thus, if bamboo is eventually discovered in the Urucu, then *D. d. devillei* might also be found.

ASH-WINGED ANTWREN *Terenura spodioptila*
The only records of *T. spodioptila* south of the Amazon are of race *meridionalis*, which is endemic to the lower Madeira–Tapajós interfluvium, well to the east of the Urucu, within a different centre of endemism (Zimmer & Isler 2003). As *T. spodioptila* and the south-west Amazonian Chestnut-shouldered Antwren *T. humeralis* are very close vocally, we believe the *Terenura* noted by Peres & Whittaker (1991) is *T. humeralis*. A good tape-recording obtained by AA on 4 July 2003 of a *Terenura* in a mixed-species canopy flock near 'Papagaio' lodge (04°51'S, 65°04'W) matches very closely the recording of *T. humeralis* on Isler & Whitney (2002). Also, *T. h. transfluvialis* is known from the following documented records in the Juruá–Purus interfluvium near the Urucu: observations and tape-recordings from Reserva de Desenvolvimento Uakarai, on the middle Juruá (05°26'S, 67°17'W), *c*.230 km to the south-west, and Lábrea (AW unpubl.), whilst the holotype of *T. h. transfluvialis* is from

Hiutanaã, Amazonas, on the left bank of the Purus (Todd 1927). We recommend replacing *T. spodioptila* with *T. humeralis* on the checklist.

BLACKISH ANTBIRD *Cercomacra nigrescens*

Recorded at the Urucu as hypothetical by voice, by M. Cohn-Haft, who was uncertain of the identification at the time (Peres & Whittaker 1991; M. Cohn-Haft pers. comm.). We can confirm that this record of *C. nigrescens* almost certainly refers to Black Antbird *C. serva*, whose loudsong pattern recalls some subspecies of *C. nigrescens* (AW pers. obs.). Furthermore, AA & FP did not record *C. nigrescens* but found *C. serva* to be the commonest *Cercomacra*, particularly in the extensive clearings along the main paved road, where several were tape-recorded and two adult males collected in 2003 (MPEG 57109–110). Finally, the hypothetical record of *C. nigrescens* at the Urucu was from *terra firme*, which is inconsistent with its ecological requirements in western Amazonia, where it is represented by the distinct *C. n. fuscicauda* in *várzea* and riverine forests. On the other hand, in this part of Amazonia, *C. serva* is the common understorey *Cercomacra* in *terra firme* (AA & AW pers. obs.). *C. nigrescens* should be removed from the Urucu list, pending documentation.

SLATE-COLOURED ANTBIRD *Percnostola schistacea*

Easily confused with Humaitá Antbird *P. humaythae* (*sensu* Isler *et al*. 2007), the record of *P. schistacea* (Peres & Whittaker 1991), if correct, would extend the latter's range hundreds of km east; the nearest known records of *P. schistacea* to the Urucu are from Jutaí Sustainable Development Area, over 400 km to the south-west, where AA and FP tape-recorded and collected five specimens in March 2006 (MPEG 60205–209). At the Urucu, AA & FP never recorded *P. schistacea*, only *P. humaythae*, including a good tape-recording obtained on 29 June 2003 in creek-side forest. We consider the record of *P. schistacea* a misidentification.

HARLEQUIN ANTBIRD *Rhegmatorhina berlepschi*

This range-restricted obligate army ant follower is a Brazilian endemic restricted to the Madeira–Tapajós interfluvium (Zimmer & Isler 2003). As all *Rhegmatorhina* are allopatric, the Urucu record of *R. berlepschi* by C. Peres is a misidentification and almost certainly involved Hairy-crested Antbird *R. melanosticta*. During their field work, AA & FP tape-recorded and collected four specimens of *R. melanosticta* (MPEG 57152–155).

VARIEGATED ANTPITTA *Grallaria varia.*

Recorded as common in tall forest by Peres & Whittaker (1991), this record would be extremely significant as this antpitta is not known west of the Madeira, in the Purus–Madeira interfluvium (Krabbe & Schulenberg 2003). However, as the distinctive voice of this antpitta was not heard by AW, M. Cohn-Haft, or by AA & FP (all of whom are familiar with it), we recommend removing this species from the list.

SPOTTED ANTPITTA *Hylopezus macularius*

Recorded by Peres & Whittaker (1991) at the Urucu based on confirmed sight records and undisputed vocal recognition by C. Peres. *H. macularius* comprises three subspecies (*H. m. macularius*, *H. m paraensis* and *H. m. diversus*), none of which is documented by specimens from near the Urucu (AW & AA unpubl.; MPEG specimens). However, *H. m. paraensis* is listed west of the Madeira, i.e. within the same centre of endemism (Ridgely & Tudor 1994, Krabbe & Schulenberg 2003). Because the ranges and morphological and vocal diagnoses of the different taxa of *H. macularius* in Amazonian Brazil are still poorly characterised, we have commenced a multi-character study to assess species limits. Until this is complete, we recommend the Urucu record be treated as hypothetical, as this population could represent an undescribed taxon (AW and AA in prep.).

RED-BILLED WOODCREEPER *Hylexetastes perrotii*
To date, the only *Hylexetastes* documented west of the Negro and Madeira is Bar-bellied Woodcreeper *H. stresemanni* (Marantz *et al.* 2003); thus, this record is a misidentification. On 30 June 2003 AA & FP collected a female *H. stresemanni* in stunted *terra firme* on sandy soil near 'Papagaio' lodge (04°51'S, 65°04'W) at the Urucu (MPEG 57058), their only record of this rare low-density woodcreeper.

CHESTNUT-RUMPED WOODCREEPER *Xiphorynchus pardalotus*
X. pardalotus exclusively occurs north of the Amazon and west of the Negro, in the Guianan Shield (Ridgely & Tudor 1994, Marantz *et al.* 2003), making its listing for the Urucu erroneous. AA & FP have tape-recorded and collected four *Xiphorhynchus* at the Urucu: Ocellated Woodcreeper *X. ocellatus*, Elegant Woodcreeper *X. elegans*, Striped Woodcreeper *X. obsoletus* and Buff-throated Woodcreeper *X. guttatus*. Given their close phylogenetic affinity (Aleixo 2002), the species most likely to be confused with *X. pardalotus* is *X. ocellatus*, which at the Urucu is strictly associated with creek-side forest. Indeed, the only *Xiphorhynchus* reported by Peres & Whittaker (1991) in creek-side forest was '*X. pardalotus*'. *X. ocellatus* was included by Peres & Whittaker (1991), but only from undisturbed tall forest. Tape-recordings and four specimens of *X. ocellatus* were obtained by AA & FP in 2003–04 (MPEG 57052–054, 58296). Purported records of *X. pardalotus* south of the Amazon between the lower rios Tapajós and Xingu (Zimmer 1934, Haffer 1997) were either misidentified or mislabelled specimens (Marantz *et al.* 2003).

CHESTNUT-CROWNED FOLIAGE-GLEANER *Automolus rufipileatus*
The only record was based exclusively on voice and thus listed as hypothetical (Peres & Whittaker 1991). We feel it best to remove the species from the list as the commonly heard rattle of the south-west Amazonian subspecies of Olive-backed Foliage-gleaner *A. infuscatus purusianus* is almost impossible (without great experience) to separate from *A. rufipileatus* (AW & AA pers. obs.). Furthermore, most *Automolus* are readily captured in mist-nets and the species has not been caught at the Urucu despite considerable effort. Finally, in western Amazonian Brazil *A. rufipileatus* is primarily associated with early-successional vegetation along watercourses, entering *terra firme* only if extensive bamboo or vine tangles are available (AA & AW unpubl.). The lack of bamboo at the Urucu (where *A. rufipileatus* was supposedly recorded in high-ground *terra firme*), combined with vocal similarities between *A. rufipileatus* and *A. i. purusianus*, prompt us to recommend removing *A. rufipileatus* from the Urucu list.

STREAKED XENOPS *Xenops rutilans*
Almost certainly a misidentification, presumably of the rather similar Slender-billed Xenops *X. tenuirostris*, which was observed and tape-recorded by AA, on 2 October 2006, in sandy-soil stunted *terra firme* near the SUC-001 oilfield. Amazonian records of *X. rutilans* are mostly restricted to the forest-savanna ecotone at the region's southern border (Ridgely & Tudor 1994, Remsen 2003; MPEG specimens), e.g. at Alta Floresta, where it occurs in deciduous forest atop rocky outcrops in *terra firme* (AW pers. obs.). The complete lack of previous records in western Amazonian Brazil casts doubt on the Urucu record, which should be removed.

HELMETED PYGMY TYRANT *Lophotriccus galeatus* /
SNETHLAGE'S TODY-TYRANT *Hemitriccus minor*

Helmeted Pygmy Tyrant was recorded as common in undisturbed tall forest (Peres & Whittaker 1991), but this represents a misidentification as *L. galeatus* does not occur in south-west Amazonia (Fitzpatrick 2004). As to the actual species involved, there are two possibilities: Snethlage's Tody-Tyrant *Hemitriccus minor pallens* or Double-banded Pygmy Tyrant *Lophotriccus vitiosus congener*, both of which occur in *terra firme* and seasonally flooded forests in south-west Amazonia (Fitzpatrick 2004). The former was tape-recorded and collected at the Urucu by AA & FP in 2003 (MPEG 57167–170), thereby confirming records of *H. minor* in Peres & Whittaker (1991). On the other hand, the Urucu apparently lies well east of the easternmost records of *L. v. congener*: observations and tape-recordings at Reserva de Desenvolvimento Uakarai, on the middle Juruá, (05°26'S, 67°17'W) *c.*230 km to the south-west (AW unpubl.), Caitaú-Uará (MPEG 50130), where tape-recorded by AW in *várzea*, *c.*240 km to the north-west, and Jutaí Sustainable Development area in March 2006 (MPEG 60236, also tape-recorded by AA in riparian forest), *c.*400 km to the south-west. We conclude that *L. galeatus* should be withdrawn from the Urucu list until some evidence is available.

YELLOW-BELLIED ELAENIA *Elaenia flavogaster*

Considering the complexity of field identification of all *Elaenia* and that this record was listed as uncertain, we recommend it be listed as *Elaenia* sp. *E. flavogaster* is extremely patchy and local in central Amazonia, with previously published records only from Alter do Chão, Pará (Sanaiotti & Cintra 2001) and south-east Amazonas (Aleixo & Poletto 2007), with unpublished sight records from a site *c.*30 km north of Manaus and Presidente Figueiredo, Amazonas, and the rio Araça, Roraima (AW pers. obs.). However, especially in savannas at the fringes of Amazonia, this species is common and more widespread (Aleixo & Poletto 2007). Several other *Elaenia* migrate to Amazonia, amongst them Small-billed Elaenia *E. parvirostris*, a common austral visitor, often at *terra firme* borders (AW pers. obs.). On 17 September 2004 AA collected a female *E. parvirostris* in disturbed *terra firme* near the Urucu headquarters (MPEG 58305).

YELLOW-OLIVE FLYCATCHER *Tolmomyias sulphurescens*

Although this widespread flycatcher is generally absent from *terra firme* in Amazonian Brazil, except *T. s. mixtus* in the easternmost part (Zimmer & Whittaker in prep.), western Amazonian records refer to *T. s. insignis*, which is associated exclusively with riverine habitats, including seasonally flooded white- (*várzea*) or black-water (*igapó*) forests, or mature river islands (Zimmer & Whittaker in prep.). A specimen of *T. s. insignis* was obtained, and tape-recorded, by AW at Caitaú-Uará on the south bank of the Solimões, *c.*240 km north-west of the Urucu, in *várzea* (MPEG 50109), whilst AW found it common, in November 2007, in riverine habitats (multiple tape-recordings) at Reserva de Desenvolvimento Uakarai, on the middle rio Juruá (05°26'S, 67°17'W), *c.*230 km to the south-west, and AA tape-recorded and collected another *c.*400 km to the south-west, at Jutaí Sustainable Development area, in March 2006 (MPEG 60239). Because the Urucu records were from undisturbed *terra firme*, they certainly involved either Yellow-margined *T. assimilis* or Grey-crowned Flycatcher *T. poliocephalus*. We recommend withdrawing *T. sulphurescens* from the Urucu list until a specimen or tape-recording is available.

BLACK-TAILED FLYCATCHER *Myiobius atricaudus*

Species-level identification in this complex is very difficult (Ridgely & Tudor 1994, Fitzpatrick 2004), but recent field work throughout Amazonian Brazil has found Sulphur-rumped Flycatcher *M. barbatus* to be the widespread *Myiobius* (Cohn-Haft *et al.* 1997, Oren & Parker 1997, Zimmer *et al.* 1997, Borges *et al.* 2001). In contrast, in Brazil *M. atricaudus* is often associated with higher ground at the outer limits of the basin (AW pers. obs.). On 28 June 2003, AA & FP collected a female *M. b. amazonicus* in stunted *terra firme* on sandy soil near 'Papagaio' lodge (04°51'S, 65°04'W) at the Urucu (MPEG 57160), a species not listed in Peres & Whittaker (1991). It is probable that their record refers to the widespread *Myiobius*, which AW had identified during his visit but was omitted from the annotated list. Both *M. barbatus* and *M. atricaudus* were collected by AA & FP a few km apart at the upper Jutaí, *c.*300 km south-west of the Urucu. Although it is possible that both *Myiobius* occur at the Urucu, we suggest waiting for specimens before listing *M. atricaudus* for the area.

LARGE-HEADED FLATBILL *Ramphotrigon megacephalum*

Observed at the Urucu in undisturbed tall and creek-side forests, where it was common (Peres & Whittaker 1991), but *R. megacephalum* is a rather strict *Guadua* bamboo specialist (Parker *et al.* 1997). No *Guadua* bamboo has been found at the Urucu, and AA & FP failed to record the species during their surveys, but *R. megacephalum* was tape-recorded, in September 1992, by AW, at Caitaú-Uará, on the south bank of the Solimões, *c.*240 km north-west of the Urucu. If bamboo is eventually located at the Urucu, it is possible that *R. megacephalum* will be found there.

TROPICAL GNATCATCHER *Polioptila plumbea*

Withdrawn from the Urucu list as its inclusion was based on a single sight record from the canopy of *terra firme*, which record almost certainly referred to the similar Guianan Gnatcatcher *P. guianensis*, a fairly common species in canopy *terra firme* flocks at the site (AW & AA unpubl.). In Amazonian Brazil, *P. plumbea* occurs locally in seasonally flooded white-water (*várzea*) or black-water (*igapó*) forest and forest edge with savanna and low *campina*, but is absent from *terra firme* (AW pers. obs.).

YELLOW-GREEN GROSBEAK *Caryothraustes canadensis*

This grosbeak was reported by Peres & Whittaker (1991), though the nearest localities are on the lower rios Negro and Madeira, well east of the Urucu (Ridgely & Tudor 1989). However, *contra* Ridgely & Tudor (1989), there are no known records of *C. canadensis* south of the Amazon in the Madeira–Tapajós interfluvium, where it is apparently replaced by Yellow-shouldered Grosbeak *Parkerthraustes humeralis* (AW pers. obs.; MPEG specimens). The Urucu record, if correct, would be the first south of the Amazon and west of the Tocantins, with the nearest south-bank records *c.*1,400 km to the east. Given that *C. canadensis* is striking and easily detected, as it travels in noisy flocks in the midstorey to canopy of *terra firme*, where it is usually fairly common, that AA & FP did not record the species at the Urucu appears highly suggestive that a mistake was made. Especially because this record would imply such an important range extension, we suggest excluding it from the Urucu list until evidence is available.

Confirmed noteworthy records

CRESTED EAGLE *Morphnus guianensis*
Checking an active raptor nest in late December 1988, discovered by Peres and assumed to be of an Ornate Hawk-Eagle *Spizaetus ornatus*, AW found instead an almost full-grown *M. guianensis*, with an adult nearby. The huge nest was in *terra firme*, in a *c*.45-m tall emergent tree, within a large open fork in the subcanopy, *c*.30 m above ground. Breeding records of this rare raptor are few (Thiollay & Bierregaard 1994). Breeding data from Bolívar, Venezuela, involve nest building in March (Hilty 2003), in south-east Peru a large chick was seen in March (Raine 2007), and at Manaus, Brazil, young hatched during the late wet season, in April (Bierregaard *et al*. 1984).

WHITE-WINGED POTOO *Nyctibius leucopterus*
A *N. leucopterus* was heard repeatedly by AW on the clear moonlight night of 30 December 1987, with which species he is very familiar, especially with its voice, from the Manaus area, having been involved in its rediscovery (Cohn-Haft 1993). As the species was considered hypothetical at the Urucu, it was not included in Peres & Whittaker's (1991) list of range extensions, although, at the time, this was the first record south of the Amazon. It was also unfortunately omitted from the account of the species' rediscovery (Cohn-Haft 1993). Subsequently, the species has been confirmed even further south-west than the Urucu, in western Acre, Brazil (Alvarez & Whitney 2003), and east to the right bank of the lower rio Xingu, at Estação Científica Ferreira Penna, in the Floresta Nacional de Caxiuanã, Pará (AW unpubl.), where it has been tape-recorded.

BAND-RUMPED SWIFT *Chaetura spinicaudus*
Recorded as uncertain in Peres & Whittaker (1991), but confirmed by AA & FP, who observed the species on all of their visits to the Urucu. Birds flying in flocks close to the ground were identified as *C. spinicaudus* based primarily on their bright, contrasting and rather restricted white rump, and fairly small overall size. Records of *C. spinicaudus* based on specimens exist for the lower Purus near the Urucu (Marín 2000).

BLACK-BELLIED THORNTAIL *Discosura langsdorffi*
The Amazonian population of this tiny hummingbird, *D. l. melanosternon*, is poorly known and very disjunct from the nominate of eastern Brazil, from Bahia south to Rio de Janeiro (Schuchmann 1999). Reported as common by Peres & Whittaker (1991), but not recorded by AA & FP. Principally an inhabitant of *terra firme*, where it is mainly observed in the canopy of large flowering trees, the species is easily overlooked (AW pers. obs.), and is rare in collections. However, further records from the Juruá interfluvium include: single females observed by AW (unpubl.), on 5 September 1992, at Caitaú-Uará, Amazonas, and, on 13 December 2007, at Fortuna, Amazonas, in the Reserva Extravista do Media Rio Juruá, on the left bank of the Juruá. These records are *c*.240 km north-west and *c*.210 km south-west of the Urucu. Both were feeding at flowering trees, one an *Inga* sp., in the subcanopy of *várzea*/*terra firme* transitional forest.

FIERY TOPAZ *Topaza pyra*
The important range extension reported by Peres & Whittaker (1991) has since been confirmed and reinforced by its discovery at several other sites in south-west Amazonian Brazil, including Tefé, just *c*.120 km north-west of the Urucu (Hu *et al*. 2000). Although present at the Urucu, *T. pyra* is apparently very scarce there, as it was not recorded by AA & FP.

BROWN-BANDED PUFFBIRD *Notharchus ordii*
Recorded by Peres & Whittaker (1991), but until the last decade the species was known only from a few field observations and specimens. With knowledge of its voice, *N. ordii* has been found throughout southern Brazilian Amazonia (AW pers. obs.). AA & FP recorded it during every trip to the Urucu, tape-recording several birds. One tape-recorded on 13 September 2004 was particularly responsive to playback, possibly indicating pre-breeding or breeding condition. *N. ordii* was also tape-recorded, on 9 September 1992, at Caitaú-Uará, Amazonas, *c*.240 km north-west of the Urucu (AW unpubl.) and was found at the Reserva de Desenvolvimento Uakarai, on the middle Juruá (05°26′S, 67°17′W), *c*.230 km to the south-west (AW unpubl.).

SHORT-CRESTED FLYCATCHER *Myiarchus ferox*
The presence of this common flycatcher at the Urucu was confirmed by AA & FP, who recorded it during every trip they made to the area, especially in the vicinity of disturbed habitats. On 22 June 2006 an adult male was collected (MPEG 57176).

GUIANAN GNATCATCHER *Polioptila guianensis*
Previously unknown from the Juruá–Purus interfluvium (Ridgely & Tudor 1989), with the nearest south-bank records far to the east, on the right bank of the Madeira (Stotz *et al*. 1997, Whittaker in prep.). Fairly common in canopy *terra firme* insectivore flocks at the Urucu, with multiple observations (AW, M. Cohn-Haft & AA unpubl.). These records remain the sole to date from this interfluvium (Whitney & Alvarez 2005) and from the Inambari centre of endemism (Silva *et al*. 2005). Specimens and tape-recordings are essential to determine whether the Urucu records represent an unnamed population of this poorly known canopy species (AW & AA pers. obs.).

BLUE-BACKED TANAGER *Cyanicterus cyanicterus*
The first record south of the Amazon was reported by Peres & Whittaker (1991) and confirmed by AA & FP who observed and tape-recorded several flocks of 5–8 *C. cyanicterus* during every trip they made to the Urucu. These are the only records of *C. cyanicterus* south of the Amazon and west of the Madeira, in the Inambari centre of endemism (Silva *et al*. 2005). Further localities south of the Amazon include Borba, in the Madeira–Tapajós interfluvium (M. Cohn-Haft pers. comm.), and the Floresta Nacional de Caxiuanã, in the northern Xingu–Tocantins interfluvium (AW & AA unpubl.).

LINED SEEDEATER *Sporophila lineola*
The presence of this austral migrant, suspected by Peres & Whittaker (1991), was confirmed by AA & FP who obtained three specimens on 19–20 June 2003, i.e. during the austral winter (MPEG 57206–208). Flocks containing many immatures, as well as adult males, were observed in a large clearing on 3 and 6 July 2003.

Taxonomic changes

Since the publication of Peres & Whittaker (1991) several species confirmed at the Urucu have been subject to taxonomic revisions adopted by the Brazilian and South American checklist committees (CBRO 2007, Remsen *et al*. 2007). These changes, with the previous and current treatments and names, respectively, are as follows: Little Chachalaca *Ortalis motmot* / Speckled Chachalaca *O. guttata*; Chapman's Swift *Chaetura chapmani* / Amazonian Swift *C. viridipennis*; Long-tailed Hermit *Phaethornis superciliosus* / Great-billed

Hermit *P. malaris;* Yellow-billed Jacamar *Galbula albirostris* / Blue-cheeked Jacamar *G. cyanicollis;* White-necked Puffbird *Notharchus macrorhynchos* / White-necked Puffbird *N. hyperrynchus;* Ivory-billed Araçari *Pteroglossus flavirostris* / Brown-mandibled Araçari *P. mariae;* Black-spotted Barbet *Capito niger* / Gilded Barbet *Capito auratus;* Warbling Antbird *Hypocnemis cantator* / Peruvian Warbling Antbird *H. peruviana;* Spot-winged Antbird *Percnostola leucostigma* / Humaitá Antbird *P. humaythae;* White-eyed Tody-Tyrant *Hemitriccus zosterops* / White-bellied Tody-Tyrant *H. griseipectus.*

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A new subspecies of Black-striped Sparrow *Arremonops conirostris* from south-eastern Ecuador

by Niels Krabbe & David J. Stejskal

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The genus *Arremonops* occurs from Mexico to northern South America and consists of 15 very similar and taxonomically confusing forms with largely allopatric ranges. Most recent authors (e.g. Dickinson 2003, Gill & Wright 2006) rank them as four species, Green-backed Sparrow *A. chloronotus*, Black-striped Sparrow *A. conirostris*, Olive Sparrow *A. rufivirgatus* and Tocuyo Sparrow *A. tocuyensis*, the two former predominantly found in semi-arid to humid habitats, the two latter in arid regions. The ranges of *A. rufivirgatus* and *A. chloronotus* overlap slightly in Honduras and on the Yucatán Peninsula, and the two occasionally hybridise (Howell & Webb 1995). No hybridisation has been reported from the marginally overlapping ranges of *A. conirostris* and *A. tocuyensis* in Colombia and Venezuela (Hilty & Brown 1986, Hilty 2003). The allocation to *A. conirostris* of the form *inexpectatus* of the arid upper Magdalena Valley in Colombia has been disputed (Chapman 1917, Hilty & Brown 1986); it has such a distinctive song and occurs so close (30 km or less) to the wide-ranging (both sides of the Andes) *conirostris* to suggest that they are reproductively isolated.

On 22–23 October 1996 we collected three males and a female of a new taxon of *Arremonops* in south-eastern Ecuador, over 650 km from the nearest known locality east of the Andes. The population is readily diagnosed, but resembles nominate *conirostris*, of Colombia, Venezuela and Brazil, more than any other taxon of *Arremonops*.

Owing to the apparently extreme geographical isolation of the new taxon, its distinctive song, specialised habitat and the difficulty of explaining its origin, we are uncertain of its taxonomic rank. Because it differs less from *A. c. conirostris* than does *A. c. striaticeps*, we take the cautious approach and describe it as a subspecies of *A. conirostris*. Being apparently restricted to the río Pastaza and its tributaries, we name the new form:

Arremonops conirostris pastazae ssp. nov.
Pastaza Black-striped Sparrow

Holotype.—Louisiana State University Museum of Natural Science (LSUMZ 161550). Adult male collected by N. Krabbe and D. Stejskal at Isla Sharamentsa, an island in the río Pastaza, at 02°29'S, 77°00'W, elevation 180 m, prov. Pastaza, south-east Ecuador, 23 October 1996. Tissue sample deposited in Zoological Museum, University of Copenhagen (ZMUC 123789). Label data.—37.6 g; no fat. Irides chestnut; maxilla blackish; mandible grey grading to blackish on tip; feet (tarsi and toes) light horn grey. No moult. No *Bursa Fabricii*. Skull 100% ossified. Testes 10 × 5 mm, seminal vesicle large. Stomach insects. Singing in *Tessaria* shrubbery on river island.

Paratypes.—Three additional specimens were collected along with the holotype on Isla Sharamentsa on 22–23 October 1996: LSUMZ 161549 (male), Museo Ecuatoriano de Ciencias Naturales, Quito (MECN) 7036 (male) and MECN 7035 (female). Tissue from the paratypes was deposited at ZMUC (catalogue nos. 123773, 123786, 123772).

Description of the holotype.—Colour numbers follow *Munsell soil color charts* (Munsell Color 1994). Crown between grey and dark grey (2.5Y 5/1–4/1), stripes on side of crown from bill to nape black, fairly broad supercilium from bill to nape grey (2.5Y 6/1). Thin line from bill through eye to sides of neck black, lower sides of head like supercilium, sides of neck like crown. Back dark grey (2.5Y 4/1) washed olive, especially on lower back, rump and tail (5Y 4/4). Wing-coverts and fringes of primaries paler, olive-yellow (5Y 6/6). Fringes of outer four pairs of rectrices pale olive (5Y 5/6). Throat whitish, broad faint breast-band light grey (2.5Y 7/1), central breast washed pale yellow (2.5Y 7/3), sides of body like sides of neck, undertail-coverts pale yellow (2.5Y 7/4), flanks with slight wash of same colour, belly whitish with barely any buff wash, underwing-coverts pale yellow (5Y8/4), bend of wing bright yellow (5Y 8/8).

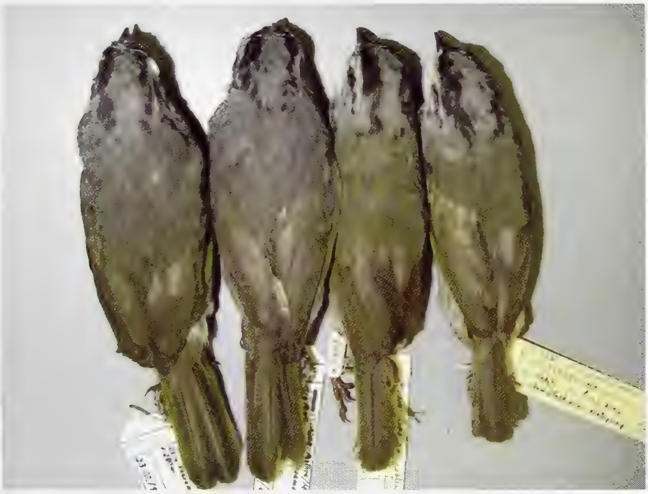

Figure 1. Dorsal view of males of Black-striped Sparrow *Arremonops conirostris*. Left two *A. c. pastazae* from Ecuador, right two *A. c. conirostris* from Venezuela (Niels Krabbe)

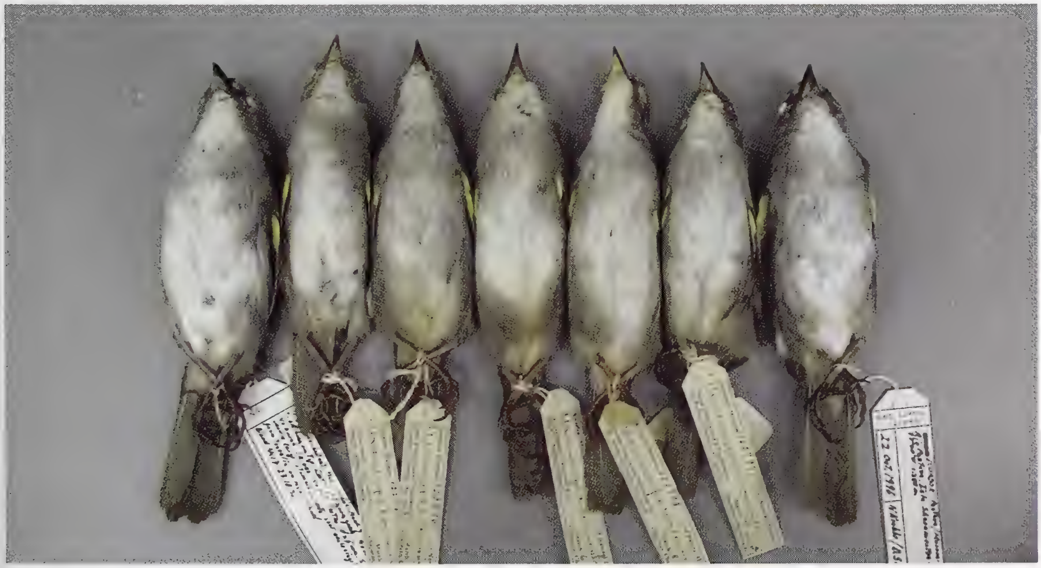

Figure 2. Ventral view of Black-striped Sparrows *Arremonops conirostris*. Furthest left and right *A. c. pastazae*, middle five, from left to right, two females and three males of *A. c. conirostris* (Niels Krabbe)

TABLE 1
Wing and tail measurements (mm) of males of four taxa of *Arremonops*.

Taxon	Wing (flat) Mean ± SD; range; *n*	Tail Mean ± SD; range; *n*
striaticeps	80 ± 1.7; 78–82; *n*=5	72.8 ± 3.2; 68–78; *n*=5
pastazae	77.8 ± 2.4; 75–81; *n*=4	65.8 ± 1.1; 64–67; *n*=4
conirostris east of Andes	75.3 ± 2.8; 69–81; *n*=40	62.3 ± 3.7; 52–71; *n*=40
inexpectatus	71; *n*=1	61.5; 61–62; *n*=2

Diagnosis.—Similar to *Arremonops c. conirostris*, but larger, bill proportionately larger, back greyer, with less or no olive-green wash (Fig. 1), throat always pure white instead of usually pallid buffy white, belly nearly pure white instead of distinctly washed pale buff, and undertail-coverts pale greyish buff instead of pale buff (Fig. 2). Undertail-coverts much like those of *A c. inexpectatus* (a taxon that otherwise resembles nominate *conirostris* except for its smaller size, yellower tail and yellower underwing-coverts). Very different from the west Ecuadorian population of *A. c. striaticeps*, from which it differs by being slightly smaller (Table 1), decidedly shorter-tailed and smaller-billed, nearly pure dark grey instead of yellowish olive on the back and wings, darker and greyer on the rump and tail, slightly darker grey on the crown, with a darker supercilium and head-sides, paler yellow underwing-coverts and wing-bend, less extensively yellow underwing-coverts, lacking a pale buff wash to the throat and breast, less washed pale buff on the belly, and greyish buff instead of yellow on the undertail-coverts.

Variation in the series.—All four specimens from the type locality are very similar, as is a fifth, collected at Arapicos (see below). One (LSUMZ 161549) differs slightly in being less washed olive on the back, which is nearly pure dark grey. All three males had chestnut irides. The female had paler (russet) irides, perhaps owing to immaturity rather than to sex. The colour of the feet ranged from light horn grey (male) to light horn brown (both sexes).

Distribution.—Known only from temporarily flooded sandbars and low islands in the upper and middle río Pastaza in south-eastern Ecuador. Besides the type locality, there is a specimen (MECN 5611), taken on 5 September 1961, at Arapicos on the río Palora, a tributary of the río Pastaza (at 01°51′S, 77°56′W; 850–900 m), prov. Morona-Santiago. One was heard by P. Coopmans (pers. comm.) on the río Pastaza at 01°36′S, 77°52′W, 710 m, *c*.12 km north-east of Arapicos in the late 1990s. The species is absent from islands with similar habitat in the río Napo (pers. obs.).

Habitat.—Apparently confined to stands of *Tessaria integrifolia* (Compositae), a 2–3-m-tall pioneer shrub that forms dense monospecific stands on temporary river sandbars.

Behaviour.—Few data were gathered. Single birds or pairs were observed as they foraged quietly in *Tessaria* scrub within 1–2 m of the ground. They were retiring and foraged on the ground, thereby easily escaping detection. Males sang from near the tops of these shrubs. Stomachs of all four specimens contained insect remains; two also some grit.

Breeding.—All four specimens collected on Isla Sharamentsa on 22–23 October had active gonads. The males were all adults with completely ossified skulls and no *Bursa Fabricii*. The female was younger (large bursa and 10% ossified skull), yet it had fully adult plumage, a large (3 cm) shell-less egg in the oviduct, and a developing brood patch.

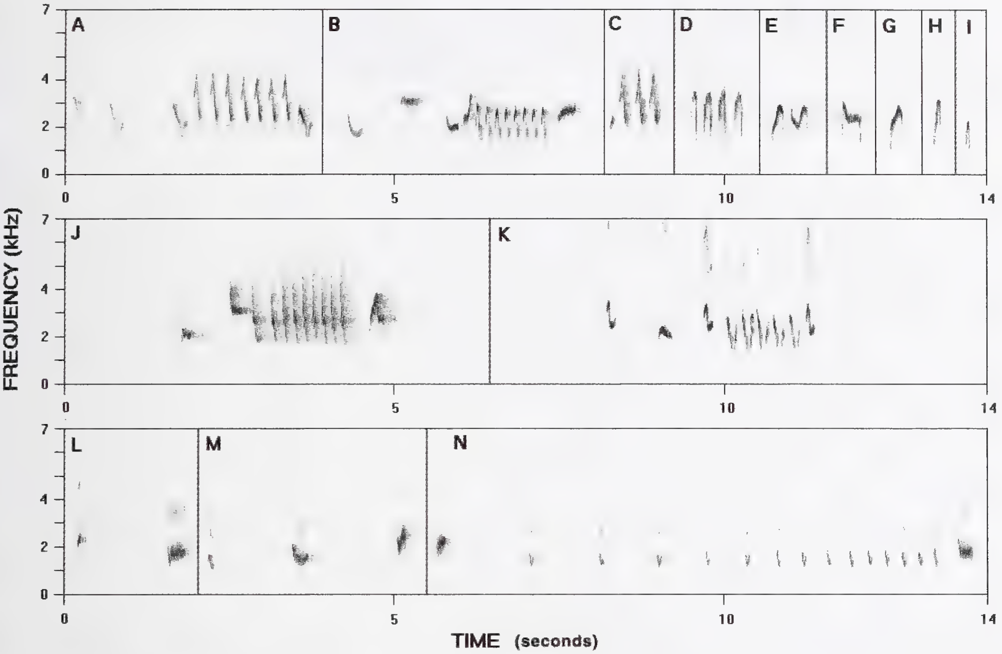

Figure 3. Song phrases of three subspecies of *Arremonops conirostris*. A–I: *A. c. pastazae* (Isla Sharamentsa, Pastaza; N. Krabbe). J–K: *A. c. conirostris* from Venezuela (J: Carabobo; K: Bolívar; both by P. Boesman). L–N: *A. c. striaticeps* from Ecuador (L: Esmeraldas; M–N: El Oro; all by N. Krabbe). Note the highly varied phrases of *pastazae*. The 'bouncy-ball' phrase (N) is only rarely given by *striaticeps* in Ecuador and by *conirostris* in Colombia and Venezuela, but is prominent in songs of Middle American forms.

Vocalisations.—Songs of 2–3 different individuals recorded on Isla Sharamentsa (Xeno-canto 19143–19149; see www.xeno-canto.org) consisted of varied phrases, each comprising 1–13 notes at 1.8–3.4 kHz (Fig. 3 A–I), and phrases given at intervals of 3–12 seconds, occasionally in immediate succession. Intervals between phrases were sometimes fairly regular, including between 'phrases' of single notes. All notes in our recordings of songs of *A. c. pastazae* differ in pitch or quality from all notes recorded in songs of two individuals of *A. c. conirostris* from Carabobo and Bolívar, Venezuela (Boesman 1999; Fig. 3J–K), but a larger sample might reveal similarity. Different song types in a single individual as well as several local dialects have been described for *A. c. conirostris* (Hilty & Brown 1986, Hilty 2002). Some complicated phrases of *conirostris* and *pastazae* show similarity in structure, being composed of a rapid succession of notes, preceded by 1–3 loud notes and sometimes terminated with one. Their songs differ distinctly in pitch and structure from songs of *A. c. striaticeps* from western Ecuador (Fig. 3L–N), which are usually stereotyped throughout western Ecuador (Fig. 3L) (pers. obs.), but occasionally include an accelerated ('bouncy-ball') series of notes (Fig. 3N). Accelerated series' of notes are common in songs of Middle American forms (Ridgely & Gwynne 1989, Stiles & Skutch 1989, Howell & Webb 1995), but have also been reported from Colombia (Hilty & Brown 1986) and Venezuela (Hilty 2003).

Population size and conservation.—Four to six territorial males were recorded in 2 ha of habitat on Isla Sharamentsa. As estimated from satellite images (Google Earth 2007), between 50 and 100 islands with on average 1 ha of *Tessaria* scrub are found between Isla Sharamentsa and Arapicos, giving a rough estimate of a total population of 100–300 pairs.

If it also occurs on the lower río Pastaza, the population could be two or three times as large. There seems to be no threat to the habitat. Owing to the great dynamics in formation and disappearance of low-lying islands and sandbars in the river, there is little or no use of these islands by humans.

Discussion.—The origin of *A. c. pastazae* is mysterious. Its morphology differs so much from that of west Ecuadorian *striaticeps* that a close relationship between the two seems unlikely. A more plausible route of colonisation would seem to be along the Andes, yet there are no records of *Arremonops* from anywhere east of the Andes between the Macarena Mountains, Colombia, and central Ecuador. As *A. conirostris* is a bird of semi-open habitats, it would be surprising if the species had escaped the detection of early collectors. Another scenario could be one of island hopping from southern Venezuela or Roraima, Brazil. Finally, the range could be relictual, reflecting a much more widespread distribution of such habitats in the past. Even if *pastazae* is the result of a very recent colonisation, the young female in breeding condition (see Breeding) suggests a very short generation time, which might explain a rapid evolutionary rate (see e.g. Sibley & Ahlquist 1990).

The isolated range and distinctive habitat and song of *pastazae*, the reported hybridisation between *A. rufivirgatus* and *A. chloronotus*, the difficulty of referring the Honduran taxon *twomeyi* to one or the other (Howell & Webb 1995), the distinctness of *inexpectatus* despite its close geographical proximity to nominate *conirostris*, and the morphological differences between the two disjunct populations of *striaticeps* (the isolated west Ecuadorian population sometimes separated as *A. s. chrysoma* (P. L. Sclater, 1860) (Chapman 1917) call for a thorough revision of species limits in the genus.

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The correct name of the 'Himalayan Buzzard' is *Buteo (buteo) burmanicus*

by John Penhallurick & Edward C. Dickinson

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Recently, Dickinson & Walters (2006: 157–158) stated that the earliest name applicable to what is either considered a race of Eurasian Buzzard *Buteo buteo* (Linnaeus, 1758) or, by others (e.g. Rasmussen & Anderton 2005: 102), a valid species, is *Buteo plumipes*, based on *Circus plumipes* 'Parbattiah' [=Hodgson], 1836 (central hills of Nepal) rather than *Buteo burmanicus* Hume, 1875. Dickinson & Walters (2006) remarked that *plumipes* was used by La Touche (1907) and Ogilvie-Grant & La Touche (1907), thus satisfying ICZN (1999) Art. 23.9.1.1. However, Hartert (1914: 1127) considered *Buteo burmanicus* 'Oates' [=Hume], 1875, to be the valid name for an upper Burmese population of *Buteo buteo*, but Hodgson's name to be preoccupied in the genus *Buteo* by *Falco plumipes* Daudin, 1800, which is cited by Hartert (1914: 1128) in the synonymy of *Buteo lagopus lagopus* (Brünnich, 1764). In terms of the current Code, this is a case of secondary homonymy (Art. 53.3).

The earliest available name for the 'Himalayan Buzzard' is *Buteo burmanicus* Hume, 1875, as correctly used by Rasmussen & Anderton (2005). We also note that Peters (1931: 235) considered *Buteo burmanicus* to be a valid name, and, indeed, a species, incorporating the range of *Buteo japonicus* (from *Falco buteo japonicus* Temminck & Schlegel, 1845), which Peters reduced to the synomy of *Buteo burmanicus burmanicus* as preoccupied by *Falco tinnunculus japonicus* Temminck & Schegel, 1845. Peters also considered the taxon *toyoshimai* Momiyama, 1927, to be a subspecies of *Buteo burmanicus*. We agree with Rasmussen & Anderton (2005) that *Buteo japonicus refectus* Portenko, 1935, although accepted as valid by Orta (1994), should be placed in synonymy of *Buteo burmanicus*, as it is 'indistinguishable in plumage and size from Chinese *burmanicus*', whilst in terms of DNA (Riesing *et al.* 2003, Kruckenhauser *et al.* 2004), *refectus* [=*burmanicus*] clustered with Upland Buzzard *Buteo hemilasius* Temminck & Schlegel, 1844, rather than *B. buteo*, suggesting that *B. burmanicus* is specifically distinct from *B. buteo*.

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The valid name for the Grey Wagtail

by Richard Schodde & Walter J. Bock, for the Standing Committee on Ornithological Nomenclature of the International Ornithological Committee

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In Opinion 882, in 1969, the International Commission on Zoological Nomenclature (hereafter the Commission) validated *Motacilla cinerea* Tunstall, 1771, as the correct name for the Eurasian Grey Wagtail (ICZN 1969). It was conserved with three other names, including *Falco peregrinus* (Peregrine Falcon), all of them published in the folio *Ornithologia Britannica: seu Avium Omnium Britannicarum tam Terrestrium quam Aquaticarum Catalogus*, attributed to the English naturalist and collector, Marmaduke Tunstall (Tunstall 1771). The folio is a four-page list of names for 241 species of English birds, in three columns: Linnaean, English and French. Fourteen names are cross-referenced to entries in the edition of *Zoologiae Britannicae* (=Thomas Pennant's *British zoology*, 1766) then current, including *Falco peregrinus*, and so appear to be available by indication (ICZN 1999, Art. 12.2.1). None of the three other names validated in Opinion 882 is cross-referenced.

Although the species in the *Ornithologia Britannica* are identifiable by English and French names drawn from Pennant (1766) and Brisson (1760) respectively, all those not so cross-referenced lack both a description and indication (Art. 12, ICZN 1999), and are technically *nomina nuda*. Such circumstances first led to the *Ornithologia Britannica* being accepted for nomenclatural purposes (ICZN Opinion 38), then to its rejection (ICZN Direction 38). However, several names first published there had been in widespread use in ornithology for decades, even centuries in the case of *Falco peregrinus*. Accordingly, the Standing Committee on Ornithological Nomenclature (SCON) of the International Ornithological Committee applied to the Commission to validate four of them in 1958, including *Motacilla cinerea* (Grey Wagtail) (Salomonsen *et al*. 1964). This application was approved in Opinion 882.

Motacilla cinerea Tunstall, 1771, has been in universal use for the Grey Wagtail ever since, in hundreds of journal papers, field lists, checklists and manuals, until Mees (2006) challenged it by adopting the next junior synonym, *Parus caspicus* S. G. Gmelin, 1774, on the grounds that *Motacilla cinerea* Tunstall was a *nomen nudum* and so inadmissible for validation by the Commission. This misinterprets the provisions of the *International code of zoological nomenclature*. Under Arts 78.1 and 80.2 of the current edition (ICZN 1999)—and Arts. 78(b) and 79(a) in the third edition used by Mees (ICZN 1985)—the Commission is empowered, when ruling in an Opinion, to suspend or exempt any nomenclatural provision in order to settle the name to be used. Moreover, under Art. 80.9 of the current edition (*l.c.*)—and Art. 78(i) in that used by Mees (*l.c.*)—no ruling of the Commission may be set aside without the consent of the Commission. If the Commission has mistakenly validated *Motacilla cinerea* Tunstall and the other *nomina nuda* in Opinion 882, then application may be made to the Commission for correction under Art. 80.4 (ICZN 1999). The SCON does not intend to pursue this course, however; and in the interim, *Motacilla cinerea* Tunstall must remain the valid name for the Grey Wagtail.

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The correct name of the population of *Xiphorhynchus ocellatus* (von Spix, 1824) recently named *weddellii* (Des Murs, 1855)

by John Penhallurick & Alexandre Aleixo

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Aleixo (2002) established that the population of Ocellated Woodcreeper *Xiphorhynchus ocellatus* (von Spix, 1824) in southern Colombia (east Guainía, east Vaupés, south Amazonas), extreme southern Venezuela (south-west Amazonas), north-east Peru (north of the Amazon in Loreto), and north-west Brazil (east to the rio Negro), is genetically distinct from others of the species. These findings were based on cytochrome-*b* sequences of a specimen from dpto. Loreto, Peru (at Louisiana State University Museum of Natural Science, Baton Rouge, USA; LSUMZ 119520), and were subsequently confirmed by additional cytochrome-*b* sequences of 11 specimens from near Iquitos, Peru (also at LSUMZ) and Jaú National Park and the lower rio Japurá region in Brazil (at Museu Paraense Emílio Goeldi, Belém, Brazil (MPEG); Aleixo *et al.* 2006). Zimmer (1934) had previously also found this population to differ morphologically from other taxa in the species: 'A good series from this range is, in general, distinguishable from true *ocellatus* by darker margins of the buff pectoral spots which are, in turn, perhaps slightly larger than in Rio Madeira skins. The mantle averages more heavily streaked, sometimes with the streaks slightly expanded to form rounded, subterminal dots. Nevertheless, numerous specimens are not more pronouncedly streaked on the back than *ocellatus*. The best marked examples, on the other hand, are not far removed from certain skins of *napensis*, showing clearly the full intergradation of *napensis* and *ocellatus*. The shoulder is even more strongly and deeply rufescent than in *ocellatus*, being far different from the condition in *chunchotambo*.'

Both Aleixo (2002) and Marantz *et al.* (2003) chose the name *weddellii* for this population, based on: *Dendrornis weddellii* [as *Weddellii*] Des Murs (ex Lafresnaye MS), 1856 ['1855'], in Castelnau, *Expédition dans les parties centrales de l'Amérique du Sud, de Rio de Janeiro à Lima, et de Lima au Para : exécutée…pendant…1843 à 1847*, vol. 1(3), Oiseaux, p.46, pl. 14, fig. 2. (No locality; types from 'Peruvian Amazon' in the Paris Museum examined by Hellmayr 1925: 311). In this, they followed Zimmer (1934), who discussed two possible names. One was *Dendrornis weddellii* Des Murs, 1856. The other was (as cited by Zimmer):

> *N*[*asica*] *Beauperthuysii* Lafresnaye, 1850, *Rev. et Mag. Zool. pure et appliquée*, 2nd ser., 2, p. 419. ('Amazonum ripas'; Pebas, Peru proposed by Hellmayr, 1925: 311.)

However, Zimmer gave the type locality of *beauperthuysii* as: 'Perú' (=Cumaná, Venezuela) and banks of the Amazon, Pebas and Santa Maria, Perú; Paris Mus. or Mus. Comp. Zool., Cambridge'. Thus, Zimmer (1934) recommended against selecting the name *beauperthuysii* for this taxon: 'There is so much confusion surrounding the former name that it may have to be dropped as unidentifiable. Elliot and, later, Bangs contended that a skin from an unknown locality, in the Lafresnaye collection, now in Cambridge, Mass., labeled '*Beauperthuysii*' in Lafresnaye's handwriting, is the type of that species, but Menegaux and Hellmayr concluded that two birds in the Paris Museum, from Pebas and Santa Maria, collected by Castelnau and Deville, are the cotypes.' Instead, he recommended the name *weddellii*: 'The name *weddellii* is definitely based on the Pebas and Santa Maria specimens of Castelnau and Deville, and if these are found to be like Cassiquiare skins, the name will be available for the form which I have briefly characterized.'

Unfortunately, Zimmer's confidence in the type locality of *weddellii* Des Murs, 1856, appears misplaced. According to both Hellmayr (1925) and Peters (1951), Des Murs (1856) did not specify any locality, and Hellmayr (1925) added merely the rather vague 'Peruvian Amazon'. Moreover, Marantz *et al.* (2003) stated: 'nomenclature complicated, however, by the fact that type specimens of the two [i.e. *weddellii* and *ocellatus*] were found to be identical when compared directly and, in addition, precise locality data are lacking for both.' Thus we conclude that the name *weddellii* is not available for the population in question. Des Murs' name is either a junior synonym of *Dendrocolaptes ocellatus* von Spix, 1824, or a *nomen dubium*, as a result of its vague type locality data.

The possible name *beauperthuysii* Lafresnaye, 1850, which antedates Des Murs' name, must be re-examined. First, the authors of the citation should be specified as Pucheran and Lafresnaye, rather than Lafresnaye alone, as was done by Hellmayr (1925), Zimmer (1934) and Peters (1951). The paper in which the name appears is by Lafresnaye, but the name is cited within the paper as *N*[*asica*] *Beauperthuysii* Pucheran et Lafresnaye. Lafresnaye says of the type locality: 'Il a été rapportée du Pérou par le voyageur Beauperthuys, et de Pepas, Sancta Maria (Haut Amazone), par les voyageurs Castelnaud et Deville', which we translate thus: 'It was brought from Peru by the traveller Beauperthuys and from Pepas [=Pebas], Sancta Maria, (upper Amazon), by the travellers Castelnaud and Deville.' Note that it was Lafresnaye who specified Pebas as the type locality, not Hellmayr. Further, Lafresnaye states that the bird resides in the Paris Museum.

There seems little basis (*contra* Elliot & Bangs, as mentioned by Zimmer above) to assume that the specimen now in Cambridge, MA, is the type specimen. As Zimmer stated: 'This specimen is undoubtedly from the Lafresnaye collection but may have reached his hands after 1850.' The label on the specimen now in Cambridge is only partly legible, and reads: 'Nasica, Dendrornis Weddelii [=weddellii] (Laf. [illegible]/ Mus. Parisiense, N. Beauperthusyii / Pucher. et Lafr. Mon. f. 51 s torso [???] [illegible] haut amazone / Voyage

Castelnau le Beauperthuysii / a été rapporté du Pérou par le/ Voyageur Beauperthuys.' Then follows in purple ink '2267', and someone (presumably Bangs) has written in black ink 'type'. Note that the label refers explicitly to specimens already in Paris Museum, and that the Cambridge specimen lacks precise locality data.

Hellmayr (1925) listed *Nasica beauperthuysii* Lafresnaye, 1850, in two places: once (p. 302) as a synonym of Cocoa Woodcreeper *Xiphorhynchus sussurans jardinei* (Dalmas, 1900), stating 'spec. collected by Beauperthuys "in Perú" [=near Cumaná, Venezuela], but not the description (spec. in Paris Museum examined).' Footnote a to this citation reads: 'According to his own notes on the labels, Lafresnaye regarded Beauperthuy's specimens as representing the juvenal plumage [of *N. beauperthuysii*].' The other citation (p. 311) occurs in the synonymy of *Xiphorhynchus ocellatus ocellatus* (von Spix, 1824), this time with the note: 'descr. and hab. banks of the Amazon ["Amazonum ripas"], coll. Castelnau and Deville (types from Pebas, Peru in Paris Museum examined).'

Thus, the source of the confusion with the name is clear: the cotypes in the Musée d'Histoire Naturelle, Paris are from Pebas, on the north bank of the Amazon in dpto. Loreto, Peru. Lafresnaye's description, given in French on pp. 420–421, relates unambiguously to the types from Pebas, Peru, as Hellmayr observed, and as the first author has confirmed. Louis Daniel Beauperthuys (1803–71) was a doctor of West Indian descent, who trained in Paris, and who investigated virulent outbreaks of yellow fever in the West Indies and Venezuela, and pointed out the causal relationship of mosquitoes in the marshes to such epidemics. The application of the name to the specimens collected by Beauperthuys in Venezuela was based on the erroneous assumption by Lafresnaye, clearly stated in his paper ('Habitat in Peruvia unde a Dom. Beauperthuys olim in Musaeo Parisiense allatus' (p. 419) i.e. 'Lives in Peru from where formerly brought to the Paris Museum by Dom. Beauperthuys'), that these came from the same Peruvian locality and were examples of the juvenile plumage of those birds from Pebas to which the description applies.

Since it appears that the name *weddellii* is unavailable for the population of *X. ocellatus* in question, it is appropriate to allocate the earlier name *Nasica beauperthuysii* Pucheran & Lafresnaye, 1850, to this taxon. The correct citation is: *Nasica beauperthuysii* [as *N*[*ASICA*] *BEAUPERTHUYSII*] Pucheran & Lafresnaye, 1850, *Revue et Magasin de Zoologie pure et appliquée*, 2$^{\text{ième}}$ sér. 2, p. 419. ('Habitat in Peruvia . . . ad fluminis Amazonum ripas, nuper ex Dominorum Castelnaud et Deville perigrinatione (p. 419) . . . de Pepas, Sancta Maria (Haut Amazone p. 420). All that needs to be done is to specify a type that unambiguously ties this name to the Pebas location. According to E. Pasquet (*in litt.* September 2006) at MNHN: 'There is a specimen of *Nasica beauperthuysii* Lafresnaye. It was compared with the type of *X. ocellatus ocellatus* by Hellmayr and the number in the general catalogue is (CG) 1991–1195. It is a clearly a Castelnau and Deville specimen, a male, from the upper Amazon' (translated from the French). There are four labels attached to the specimen, which read:

Dendrornis ocellata (Spix)/Mâle/Haut-Amazone Castelnau & Deville |

Type de Nasica beauperthuysii Lafr. |

D. Beauperthuysii Laf./Male/ ocellata (Spix)/comparé au type par Hellmayr |

Nasica beauperthuysii Lafresnaye/CG 1991 1195/ (=Xiphorhynchus o. ocellatus(Spix))/comparé au type par Hellmayr/Mâle |

Accordingly, we propose the name *Xiphorhynchus ocellatus beauperthuysii* for the race in southern Colombia, extreme southern Venezuela, north-east Peru and north-west Brazil. We further specify, in accordance with Art. 74 of the *Code* (1999), the male specimen, collected by Castelnau et Deville, in the Muséum National d'Histoire Naturelle, Paris, no. 1991–1195, as the lectotype of *Nasica beauperthuysii* Pucheran & Lafresnaye, 1850.

Acknowledgements

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A second museum specimen of Large-billed Reed Warbler *Acrocephalus orinus*

by D. J. Pearson, P. R. Kennerley & S. Bensch

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While checking specimens of Blyth's Reed Warbler *Acrocephalus dumetorum* from India at the Natural History Museum, Tring, in September 2006, PRK noticed a bird with a bill rather longer and broader than in other specimens. The bird, collected in October 1869 in Uttar Pradesh, was examined in detail by PRK and B. J. Small. Measurement confirmed the large bill. As it was in moult, with the outer primaries partly grown, few wing formula criteria could be checked, but emargination was noted on p5 (primaries numbered ascendently). Moreover, the freshly growing body plumage was slightly warmer than in newly moulted Blyth's Reed Warbler. It was compared with the holotype of Large-billed Reed Warbler *A. orinus*, also held at Tring, and, though a shade paler above, the specimen was considered to be of the same species. DJP then examined and measured the bird, and agreed with the identification, noting tarsus and hindclaw lengths above ranges expected in Blyth's Reed Warbler, broad tips to the newly growing primaries, and rather narrow tips to the growing central tail-feathers. A small skin sample from the sole of the specimen's toe was then sent to SB for DNA analysis.

DNA extraction and molecular analyses followed Bensch & Pearson (2002). Because the sample was old, and the DNA partially degraded, the cytochrome-*b* segment between the primers L14841 and H15149 could not be amplified as one contiguous fragment. Four sets of primer pairs were therefore used as previously specified (Table 2 *in* Bensch & Pearson 2002). Successful amplifications were obtained with all of the four combinations of primers and direct sequencing from both ends resulted in a concatenated sequence of 306 novel nucleotides. The sequence obtained (GenBank accession no. EU490497) differed from published sequences of the type specimen (Bensch & Pearson 2002) and a live bird trapped in Thailand in March 2006 (Round *et al.* 2007), at six and five positions respectively (all being transitions), corresponding to sequence divergences of <2%. The two previously published Large-billed Reed Warbler sequences give the best BLAST-hits in the GenBank database, followed by several cytochrome-*b* sequences from Blyth's Reed Warbler. A cytochrome-*b* divergence of 2% is certainly high for intra-species divergence in birds (Johns & Avise 1998), but is not exceptional within *Acrocephalus* (Leisler *et al.* 1997). All other known Eurasian *Acrocephalus* taxa have been sequenced, and cytochrome-*b* divergences between these and the Uttar Pradesh bird exceed 7%. The molecular analysis thus supports the bird being the third known example of Large-billed Reed Warbler.

Full details of the specimen are as follows (measurements in mm): registration no. 98.9.1.1233, collected in October 1869 at Mussourie, Uttar Pradesh, India, by W. E. Brookes. Sex female. Wing (close to full length) 59; tail (slightly short of full length) 55; bill-length (to skull) 20.0; bill-width (across rear of nostrils) 4.7; tarsus 24.5; hindclaw 7.3. The body and head plumage are freshly moulted. The primaries are in moult, with the inner six feathers on each wing new, pp2–4 partly grown and p1 missing. The inner secondaries are also partly grown. The central tail-feathers are in sheath and apparently not full length. The plain olive-brown upperparts are rather warmer and slightly darker than in freshly moulted Blyth's Reed Warbler, whilst the underparts possess a stronger buffy-brown wash across the breast. The lower mandible appears deeper than in Blyth's Reed Warbler, and broader towards the tip. It is entirely pale, lacking the dusky sides near the tip shown in Blyth's Reed, and this tends to enhance its oversized impression.

It now appears that there are three examples of this little-known species: a) the type, an unsexed bird collected near Rampur, Himachal Pradesh, north India, on 11 November 1867, a poorly prepared skin with indications of incomplete growth on pp2–4; b) the bird mist-netted at Liam Pak, south-west Thailand, on 27 March 2006, described in detail by Round *et al.* (2007); and c) the October specimen discussed here. Based on these three examples, the criteria for distinguishing Large-billed Reed Warbler from Blyth's Reed Warbler in the field or the museum appear to be the following: the more rounded wing, with wing-point at pp4–5 and p5 emarginated; the larger bill (length to skull >19 mm; width at rear of nostril >4.5 mm); the longer tail (>55 mm) and larger tail/wing ratio (>90%, compared with <85% in Blyth's Reed); the slightly longer tarsus (>23 mm, but potentially overlapping) and longer hindclaw (>7 mm); and distinctly broad-tipped primaries and more point-tipped rectrices.

Hopefully, a search in other museums amongst specimens of small plain-backed *Acrocephalus* from southern Asia will reveal more, previously unidentified, examples of this recently rediscovered species.

Acknowledgements

For access to specimens we thank staff of the Natural History Museum, Tring.

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Designation of a neotype for the dove known as *'Streptopelia risoria'*

by Thomas M. Donegan

Received 30 August 2007

Columba risoria (Ringed Dove, Ringed Turtle Dove or Barbary Dove) was described by Linnaeus (1758) and transferred to the genus *Streptopelia* by Bonaparte (1855). These doves are kept in captivity in many parts of the world, being used frequently in biological research (cf. Baptista *et al.* 1997), or as pets by bird fanciers. Feral or escaped populations of *S. risoria* occur in various countries (Donegan & Huertas 2002).

Due to their morphological similarities, *S. risoria* is widely considered to be a domesticated descendant of African Collared Dove *S. roseogrisea* (Sundevall, 1857), which occurs in south-west Mauritania and Senegambia east to coastal Eritrea and Somalia, and Arabia (Gibbs *et al.* 2001). As *S. risoria* is senior to *S. roseogrisea*, application has been made to the International Committee of Zoological Nomenclature to conserve the name *S. roseogrisea*, in order to adopt the same approach to these taxa as that applied to names for domesticated mammals (Donegan 2007).

The nomenclature of *S. risoria* and *S. roseogrisea* is complicated by the apparent reference to individuals of other (current) *Streptopelia* species in the description of *Columba risoria*. Linnaeus (1758) included only a brief, ambiguous text and referred to descriptions by Aldrovandi (1599), Willughby (1678), Ray (1713) and Albin (1738). These works include plates and descriptions of birds similar to leucistic, domestic Ringed Doves (Aldrovandi and Willughby plates; Aldrovandi, Willughby and Ray descriptions of the 'male'), birds currently referred to as wild *S. roseogrisea* (possibly, Aldrovandi, Willughby and Ray descriptions of the 'female') and birds currently referred to as wild Eurasian Collared Dove *S. decaocto* (Frivaldszky, 1838) (Albin's plate and description and, possibly, Aldrovandi, Willughby and Ray descriptions of the 'female'). The specimens illustrated by Aldrovandi (copied by Willughby) and Albin were probably live on depiction and are undoubtedly lost.

Although Baptista *et al.* (1997) noted that *S. decaocto* and *S. risoria* could be synonyms, almost all other literature on the topic ignores Linnaeus' (1758) references to *S. decaocto* or wild *S. roseogrisea* material in the description of *S. risoria*, and treats *S. risoria* as referring to

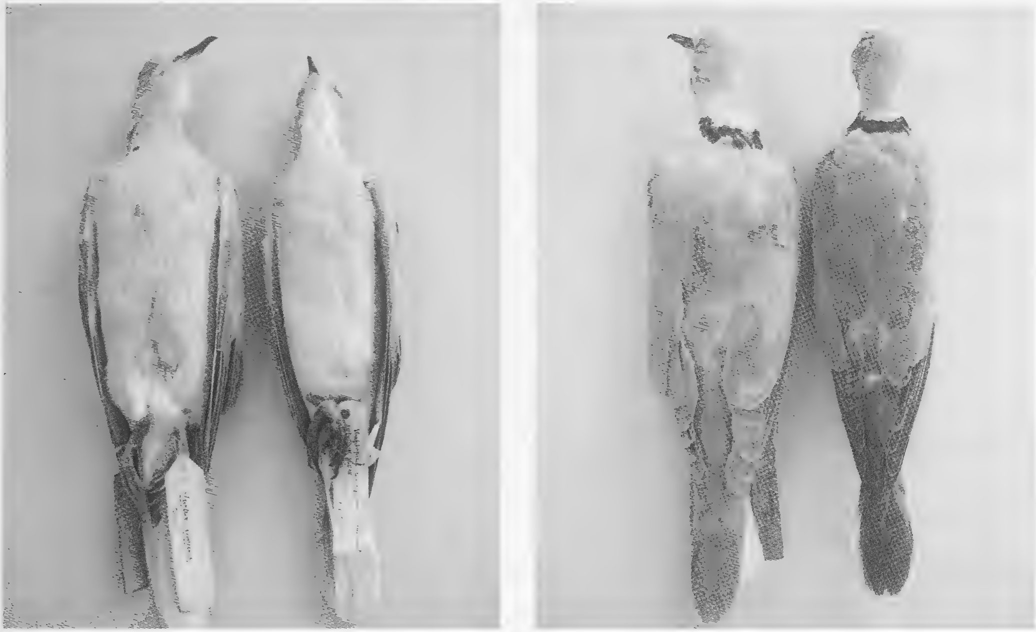

Figure 1. *Streptopelia risoria* neotype (left: BMNH 2008.3.1) and specimen of *S. roseogrisea* (BMNH 1915.12.24.368) collected at Khartoum, Sudan, 28 May 1912 (Thomas M. Donegan, © Natural History Museum, Tring)

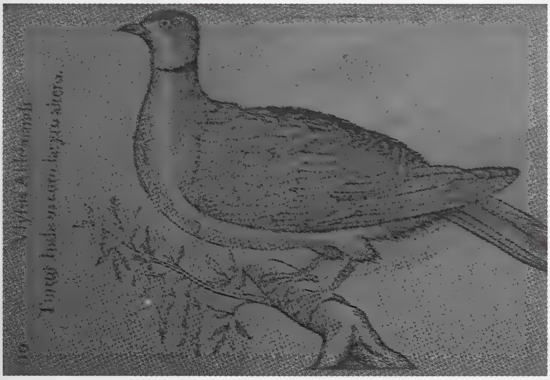

Figure 2 (above). Aldrovandi (1599) plate referred to by Linnaeus (1758) in description of *S. risoria*.

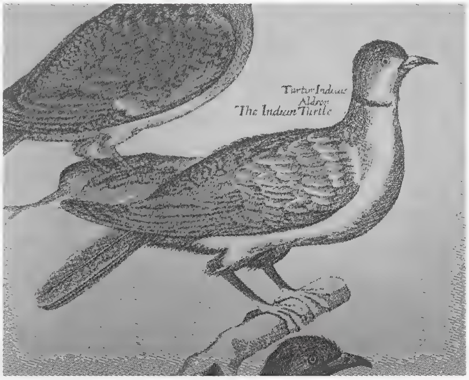

Figure 3 (right). Willughby (1678) plate referred to by Linnaeus (1758) in description of *S. risoria*.

domesticated populations of the Ringed Dove, to which the majority of illustrations and descriptions referenced in the original description refer.

In connection with the application to conserve the name *S. roseogrisea*, a neotype of *S. risoria* is assigned below in order to stabilise further the intra-generic nomenclature of *Streptopelia*. No name-bearing holotype for *S. risoria* is believed extant and a name-bearing type is necessary to define the nominal taxon *S. risoria* objectively. Such a designation has as its express purpose clarification of the taxonomy of *S. risoria*, *S. roseogrisea* and *S. decaocto*.

There are various *S. risoria* specimens in the Natural History Museum, Tring. Two showing characteristics depicted in Aldrovandi's plate are from Great Britain, one from an aviary (BMNH 81.5.1.2776) and the other possibly an escaped bird (BMNH 91.3.14.2). A further specimen is deemed as being from 'India', but lacks further details (BMNH 2008.3.1).

Specimens of '*S. risoria*' from the Thorpe collection were not considered due to the large number of hybrids in that collection.

Linnaeus, and all the other authors referred to in Linnaeus' description, considered *S. risoria* to occur in India. However, *S. risoria* has no natural distribution, meaning that precise locality data of a type specimen are of limited importance. The BMNH 'India' specimen therefore emerges as an apt candidate for the neotype of *S. risoria*.

> Neotype: Natural History Museum, Tring (BMNH 2008.3.1), undated and unsexed, location 'India'. Based on labels attached to other *Streptopelia* specimens, the original museum label probably dates from the late 1800s. Plumage is as illustrated in Fig. 1, consistent with Aldrovandi's (Fig. 2) and Willughby's (Fig. 3) illustrations and descriptions.

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Gina Douglas (Linnean Society of London), Natural History Museum and University College London library staff and Blanca Huertas (Natural History Museum) assisted with references. Mark Adams (NHM) kindly provided a new specimen number for the neotype. Thanks to ICZN staff (especially Svetlana Nikolaeva) for their suggestion to designate a neotype for *S. risoria*.

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The name of the easternmost population of Common Nightingale *Luscinia megarhynchos*

by Edward C. Dickinson

Received 21 October 2007

This population, which occurs from Iran and Kazakhstan east to China, was called *Luscinia megarhynchos golzii* Cabanis, 1873, until Dementiev (1932) substituted the name *Luscinia hafizi* Severtsov, '1872', as well as substituting *Corvus corax subcorax* Severtsov, '1872' for *Corvus corax lawrencei* [*sic*] Hume, 1873. In support he referred to Severtsov (1875) who claimed that his 'Vertical and horizontal distribution of Turkestan animals' had appeared in December 1872. Dementiev's changes were adopted, by Ripley (1964) for the nightingale and Vaurie (1962) for the raven, unchallenged until the claimed 1872 publication date was investigated by Stepanyan (1988), who concluded that 1873 (the date on the wrapper) must be maintained.

However, as regards the nightingale, Stepanyan (1990: 529, 2003: 576) did not reverse the change made by Dementiev. Nonetheless, a reversal is justified; Art. 23.9 of the *International code of zoological nomenclature* (ICZN 1999) is not applicable as the condition of non-usage since 1899 is not met, because *golzii* was used until 1932. The name *golzii* first appeared in the January 1873 issue of the *Journal für Ornithologie*. Whilst it is possible that Severtsov's paper appeared prior to this, it is not certain and no firm evidence is available as to when Severtsov's work became available. It is quite widely known that the dates of publication of some early numbers of the *Journal für Ornithologie* are unreliable, see, for example, Mathews (1920), but no evidence has yet been found that *this* issue was delayed and one must therefore rely upon the 'specified date' (Art. 21, ICZN 1999), and revert to using Cabanis' name.

The case of the 'raven' is quite different. Ivanov (1969) demonstrated that the holotype of *Corvus corax subcorax* Severtsov pertains to *Corvus ruficollis*, making *subcorax* a synonym of that monotypic species and leaving *Corvus corax laurencei* Hume, 1873, available. This was discovered by Cees Roselaar and footnoted in Dickinson (2003), but overlooked by Dickinson *et al.* (2004), who were corrected by Dickinson & Wells (2006).

Acknowledgement

Grateful thanks to Vladimir Loskot for helping with the 2006 correction to the raven, providing the Ivanov reference and for tracking down the paper by Stepanyan (1988).

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Lectotype designation for *Cinnyris proteus* Rüppell, 1840 (Nectariniidae)

by Frank D. Steinheimer

Received 14 January 2008

In 1845, Eduard Rüppell (1845: 26) described the same sunbird taxon he had already described earlier. Rüppell (1840: 91, main text and footnote; for publication date see Sawyer 1952) had proposed a new species name *Cinnyris proteus* for what is today the south-east Sudanese, Ethiopian, Eritrean and northern Kenyan form of the Scarlet-chested Sunbird *Chalcomitra senegalensis* (Steinheimer 2005a). In the protologue, nevertheless, Rüppell (1840: 91) based the name both on an illustration in Levaillant's (1813) *Histoire naturelle des oiseaux d'Afrique* and on specimens of his own which, believing them to be similar, he described as well (first footnote, p. 91). Since all birds in Levaillant's work lack scientific binomials, any author giving a Latin binomial by direct reference to any of Levaillant's birds acted as the original describer—see Arts. 12.2.1 and 12.2.7 of the *International code of zoological nomenclature* (ICZN 1999). Both Levaillant's illustration (or specifically the specimen on which it was based [(ICZN 1999: Art. 74.4)] and Rüppell's own material cited in the protologue of *proteus* (Rüppell 1840) are thus syntypic for that name.

Subsequently, it was found that Levaillant's figure was of a different subspecies from Rüppell's specimens, and that it had already been named by Linnaeus (1766: 186) as *Certhia gutturalis*, albeit with an erroneous type locality 'Brasilia' (an error copied from the otherwise very thorough description by Brisson 1760: 658–659, pl. 33, fig. 3). Today *gutturalis* Linnaeus is accepted as a valid subspecies of *Chalcomitra senegalensis* (Gadow 1884: 91, Rookmaaker 1989: 207, 327; R. J. Dowsett *in litt*. 13 January 2008).

Cinnyris proteus Rüppell, 1840 vs. *Nectarinia cruentata* Rüppell, 1845

Five years later, Rüppell (1845: 26–27, pl. 9) redescribed *proteus* based largely on the same type material as in 1840, but under the different name *cruentata* Rüppell, 1845. Rüppell's second description contains passages already given in 1840, clearly indicating that it indeed applies to the same taxon, but it nevertheless excludes reference to Levaillant (1813) and his figure. Bonaparte (1850) was the first to recognise this, but he synonymized

Cinnyris proteus with *Nectarinia cruentata*, contrary to the law of priority. To my knowledge, nobody since then has ever used the senior name *proteus* Rüppell, 1840, for the form commonly known today as *Nectarinia cruentata* Rüppell, 1845 (*cf.* Cheke & Mann 2001, Dickinson 2003, Steinheimer 2006). In these circumstances, it seemed preferable to establish *Nectarinia cruentata* as a *nomen protectum*. Nevertheless, although the terms of Art. 23.9.1.1 (ICZN 1999) may be met, those of Art. 23.9.1.2 are not: *cruentata* Rüppell has not been used more than 25 times in the last 50 years. Accordingly, I submitted an application to the ICZN to give the name *Nectarinia cruentata* Rüppell, 1845, precedence over *Cinnyris proteus* Rüppell, 1840, based on prevailing usage (Steinheimer 2006). This application was rejected in the second round of voting (first 15 to 13 affirmative, second 6 to 17 negative: ICZN 2007). Thus the valid name for this form, with the proviso explained below, becomes *Chalcomitra senegalensis proteus* (Rüppell, 1840). The word '*proteus*' is a noun in apposition, thus invariable, deriving from the Greek mythological being 'Proteos' and the Latin 'Proteus'—a sea god, fabled to assume various shapes (N. David *in litt.* 12 January 2008; see also Art. 26, ICZN 1999). Originally, Levaillant (1813: 165) applied this name in the French spelling 'Protée' because of the various shades of colours and different plumages this species can possess. The proviso is contingent on lectotypification of a specimen of Rüppell's own material of *proteus*, which would automatically exclude Levaillant's (1813) fig. 2 on pl. 295 and text (pp. 165–167), which, as explained above, applies instead to *Chalcomitra senegalensis gutturalis* (Linnaeus, 1766) from 'Caffrerie' (i.e. Tembu- and Pondoland, Eastern Cape, South Africa), later corrected to probably Maputo, southern Mozambique (Clancey 1994).

Lectotype designation of *Cinnyris proteus* Rüppell, 1840

Accordingly, I here designate the following specimen in the Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt am Main (SMF) from Rüppell's own material, from Simen, Ethiopia, as the lectotype of *Cinnyris proteus* Rüppell, 1840: 91, footnote:

> Lectotype: SMF 12664 (Steinbacher 1949: 116, Hartert 1891: 30, no. 442, first specimen). Adult male. Loc.: Valley of Province Simen (6,500 franz. [ft.]), Ethiopia. Collected by Rüppell in July–August 1832 [data on first SMF collection label: »*Nectarinia cruentata* et *proteus* Rüppell, ?, Simen i. Abyssinien, Geschenk von Dr Rüppell 1832, [Rüppell No.] 597«].

Known paralectotypes: BMNH 1837.6.10.712 [(Gadow 1884: 94, sp. b). Female. Loc.: (Province Simen), Ethiopia, Rüppell (in 1832), (number not given), (exchange SMF 1834)]; SMF 72477 [Immature/eclipse male. Loc.: (Province Simen), Ethiopia, Rüppell (in 1832), (number not given)]; SMF 72478 [Female. Loc.: (Province Simen), Ethiopia, Rüppell (in 1832), (number not given)]; SMF 72479 [Female. Loc.: (Province Simen), Ethiopia, Rüppell (in 1832), (number) 397c]; SMF 72480 [Immature/eclipse male. Loc.: (Province Simen), Ethiopia, Rüppell (in 1832), (number not given)]; a sixth paralectotype from Rüppell's collection, BMNH 1837.6.10.711 [(Vell. Cat. XXVI: 26e, Gadow 1884: 94 sp. a)] could not be traced in 2002 (Steinheimer 2005b). Possible paralectotype: RMNH 133141 [Temminck Cat. No. 1, Adult male. Loc.: Abyssinia, (no collector given = probably Rüppell via SMF and Temminck)] (Dekker & Quaisser 2006: 68). Any specimen used for Levaillant's (1813: pp. 165–167, pl. 295, fig. 2) description of 'Sucrier-Protée' (none has been traced at the museums of Leiden and Paris; H. van Grouw, E. Pasquet & C. Quaisser *in litt.* March 2008) also automatically becomes a paralectotype of *Cinnyris proteus* Rüppell, 1840.

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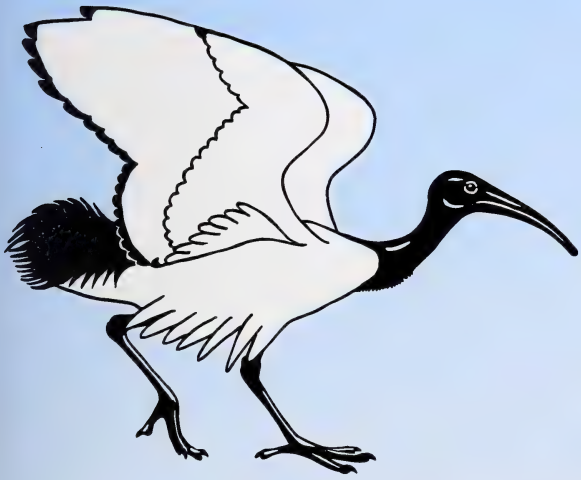

Volume 128 No. 3
September 2008

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23 September—Dr Sam Turvey—*New Zealand's moa: biology and extinction of the world's strangest birds.* Among the largest birds that ever lived, moas rapidly became extinct following human arrival in New Zealand. Can their subfossil remains tell us anything about their ecology, or whether they might have been 'pre-disposed' to be overexploited by humans?

Sam Turvey is a Research Fellow at the Institute of Zoology, Zoological Society of London (ZSL). He researches the ecology of bird and mammal extinctions, particularly on islands, as well as developing conservation projects for ZSL's Edge of Existence programme.

Applications to Hon. Secretary (address below) by **9 September 2008**

4 November—Richard Price—*The special birds of Morocco.* This talk will comprise a review of some of the outstanding birds of Morocco, including the endemics and potential endemics, to be found in this stunningly beautiful and varied country.

Richard Price has been watching birds since he was a boy, and has been a member of the BOU for 40 years and the Club almost as long. He has been visiting Morocco over the period 2005–08. Richard is a solicitor practising in the City of London specialising in international IP litigation.

Applications to Hon. Secretary (address below) by **21 October 2008**

Provisional dates for 2009: 27 January, 10 March, 28 April (AGM), 7 July, 22 September and 10 November. A summer outing may also be arranged.

Overseas Members visiting Britain are especially welcome at these meetings, and the Hon. Secretary would be very pleased to hear from anyone who can offer to talk to the Club giving as much advance notice as possible—please contact: S. A. H. (Tony) Statham, Ashlyns Lodge, Chesham Road, Berkhamsted, Herts. HP4 2ST, UK. Tel. +44 (0)1442 876995 (or e-mail: boc.sec@bou.org.uk).

Contributors See the March issue of each volume for guidelines or the BOC website Bulletin pages, at www.boc-online.org/bulletin.htm

Bulletin of the

BRITISH ORNITHOLOGISTS' CLUB

Dinner Meetings – September & November 2008

BOOKING FORM

Because arrangements for meetings have to be made with Imperial College well in advance, Members are asked to send bookings **14 days beforehand**. If you book and subsequently find you are unable to attend, please notify the **Hon. Secretary** as soon as possible. If the booking is cancelled less than 5 days before a meeting, the payment will not normally be refunded, unless the booking can be offered to another member. (Late applications can usually be taken up to am. on the **Friday** preceding a meeting). Vegetarian meals can be provided - please make your request at the time of booking. **Limited car parking** (at a special charge of **£5.00** - this is no longer free), can be arranged on prior application to the ***Hon. Secretary***, giving details of car registration.

Have you recently looked at our website - **http://www.boc-online.org**?

✂--

Tuesday 4th November – Richard Price – "Birds of Morocco"

I wish to attend with ....guests. Name(s) of my guest(s)............................ ....

My cheque for .... (**£22.50** per head) is enclosed.

Name...Tel..................

➡ Please return (or e-mail) to: The **Hon. Secretary BOC,** (Tony Statham), Ashlyns Lodge, Chesham Road , Berkhamsted, Herts. HP4 2ST. Tel: 01442-876995 **by Tuesday 21st October**

✂--

Tuesday 23rd September – Dr Samuel Turvey – "*New Zealand's moa: biology and extinction of the world's strangest birds*"

I wish to attend with ....guests. Name(s) of my guest(s)............................ ....

My cheque for .... (**£22.50** per head) is enclosed.

Name...Tel..................

➡ Please return (or e-mail) to: The **Hon. Secretary BOC,** (Tony Statham), Ashlyns Lodge, Chesham Road, Berkhamsted, Herts. HP4 2ST. Tel: 01442-876995 **by Tuesday 16th September**

✂--

Provisional dates for 2009 are January 27, March 10, April 28 (incl. AGM), July 7, September 22 and November 10 – all speakers to be announced.

MEETINGS are normally held in the **Sherfield Building** of **Imperial College**, South Kensington, London
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Bulletin of the
BRITISH ORNITHOLOGISTS' CLUB

Vol. 128 No. 3 Published 12 September 2008

CLUB ANNOUNCEMENTS

Congratulations to the British Ornithologists' Union (BOU) on its 150th anniversary

The BOC extends warmest congratulations to the BOU on reaching its 150th anniversary. Prof. Alfred Newton, the Revd. Henry Tristram and six other ornithologists founded the BOU, on 17 November 1858, at Magdalene College, Cambridge. A list of 20 founder members was decided and one of the first resolutions was to establish a new journal entirely devoted to birds. The first issue of *Ibis* was issued in January 1859 with Dr P. L. Sclater as editor. Subsequently, the BOC was founded in October 1892 'for the purpose of giving members of the British Ornithologists' Union an opportunity for meeting more frequently than the customary once a year'. Space does not permit a full description of the initial rules, but it is interesting to note that Dr P. L. Sclater was the first Chairman and that the Club met on the third Wednesday in every month from October to June. 'At the Meeting papers upon Ornithological subjects (will) be read, specimens exhibited and discussion invited' and 'an abstract of the proceedings' would be printed as soon as possible after each meeting as the *Bulletin of the British Ornithologists' Club* with Dr R. Bowdler Sharpe as editor.

The 948th meeting of the Club was held on Tuesday 29 January 2008, in the Senior Common Room of the Sherfield Building, Imperial College, London. Twenty-four members and seven guests were present.

Members attending were: Cdr. M. B. CASEMENT RN (*Chairman*), Miss H. BAKER, Mrs D. M. BRADLEY, Dr N. J. COLLAR (*Speaker*), Ms K. COOK, D. J. FISHER, J. B. FISHER, F. M. GAUNTLETT, Revd. T. W. GLADWIN, D. GRIFFIN, R. H. KETTLE, Dr C. F. MANN, D. J. MONTIER, Mrs M. N. MULLER, P. J. OLIVER, A. J. PITTMAN, R. C. PRICE, Dr R. P. PRŶS-JONES, R. J. PRYTHERCH, Dr C. RYALL, P. J. SELLAR, S. A. H. STATHAM, C.W.R. STOREY and P. J. WILKINSON.

Guests attending were: D. BRADLEY, Mrs C. R. CASEMENT, N. CHESHIRE, Mrs M. H. GAUNTLETT, Mrs J. GLADWIN, Mrs M. MONTIER and C.A. MULLER.

After dinner, Nigel Collar spoke about *Birds and people*. Eggs for breakfast, turkey salad for lunch, *coq au vin* for dinner, everyday speech (from 'lame-duck president' to 'cloud cuckoo land'—even 'auspicious' means, at root, 'from good birdwatching'), product and team-sport logos conveying speed and strength, national treasures on currency, insulation and comfort of bedding—our use of birds sits at the root of our lives, and we can parse it into three broad categories, broadly running in chronological if overlapping sequence: (1) association and inspiration, (2) semi-sustainable services and (3) intolerable exploitation.

Into the first category fall their use in symbol, myth and art, reflected across many cultures: Horus the falcon of pharaonic creation, the swan-morph of Zeus in his union with Leda (beloved of painters, and since Leonardo commonly depicted as consensual), pelican, phoenix, dove and Goldfinch (Christian symbols, the first two probably mistaken for flamingos), parrots (embodiments of the New World's earthly paradise), and the sounds used by composers since notation began.

Into the second fall their more practical values to human society: quills for writing, flights for arrows, feathers for status and insulation, songster pets (an ancient trade), ornamental and competitive pets (junglefowl and pigeons), domestic foodstuffs (junglefowl and pigeons), subsistence and sport falconry, cormorant-fishing, hornbill ivory, coalmine canaries, vultures for body disposal, and the great environmental service of insect control.

Into the third pack the nightmare histories of human exploitation at its most unrestrained: the destruction of the Great Auk *Pinguinus impennis*, Passenger Pigeon *Ectopistes migratorius* and ancient seabird colonies of the Pacific (all for food), astonishing slaughter for 19th-century feather fashions (herons, hummingbirds and birds-of-paradise especially), the millenia-old, never-ending saga of European songbird killing, appalling industrial-scale poultry farming, gangland syndication of the birds'-nest soup trade, nation-to-nation violence over guano, and the disgrace of the global wild bird trade.

For all this, birds still offer a lifeline: we use them as indicators of environmental health, as scientific models that teach us about ourselves, and as objects of wonder. When these elements combine they bring us the inspiration and instruction we need to manage our planet for *all* its inhabitants.

THE NATURAL
HISTORY MUSEUM
17 SEP 2008

The 950th meeting of the Club was held on Tuesday 29 April 2008, in the Sherfield Building, Imperial College, London. Twenty-three members and six guests were present.

Members attending were: Cdr. M. B. CASEMENT RN (*Chairman*), D. N. S. ALLEN, Miss H. BAKER (*Vice Chairman*), D. R. CALDER, Ms K. COOK, Dr J. COOPER, D. J. FISHER, F. M. GAUNTLETT, Revd. T. W. GLADWIN, D. GRIFFIN, K. HERON JONES, Dr J. P. HUME, R. H. KETTLE, R. R. LANGLEY, Dr C. F. MANN, D. J. MONTIER, R. C. PRICE, Dr R. P. PRŶS-JONES, P. J. SELLAR, S. A. H. STATHAM, C. W. R. STOREY, M. J. WALTON and P. J. WILKINSON

Guests attending were: Mrs C. R. CASEMENT, Mrs M. H. GAUNTLETT, Mrs J. M. GLADWIN, Mrs J. HERON JONES, Mrs M. MONTIER and Mrs H. PRICE.

After dinner, several members gave short talks. **Robert Prŷs-Jones** began with an outline of *Kálmán Kittenberger (1881–1958): an important but unfortunate collector of African birds* who collected thousands of birds in East Africa during the early 20th century prior to World War I. The great majority were sent to the Hungarian National Museum, where Julius Madarász described an array of new taxa based on them; subsequently they all perished in a fire that engulfed the collection in 1956, though information on them survives in detailed notes taken by Kittenberger and published posthumously. The talk drew attention to an array of Kittenberger specimens, and letters relating to them, that still exist, either because he sold them elsewhere or because they were part of a batch confiscated by the British authorities in Uganda. Kittenberger was a quite significant collector of East African birds, but was unfortunate in the fates that they suffered and he has been largely neglected as a result.

Tom Gladwin then addressed *White Wagtails (Motacilla a. alba) wintering in Britain*. He recounted how he and his wife were drawn to examine a group of 29 *alba* wagtails at Minsmere, Suffolk, on 3 November 2007, of which possibly as many as nine were White Wagtails *Motacilla a. alba*. On 10 December 2007, during a visit for the British Trust for Ornithology's Bird Atlas 2007–11 project, their attention was drawn to two *alba* wagtails with strikingly white underparts and no visible grey on the flanks, at Digswell, Herts. These birds appeared to be feeding apart from, and only loosely associated with, a group of Pied Wagtails *M. a. yarrelli*. The generally pale female also had a distinct supercilium and the observers concluded that it was possibly a White Wagtail. The male, which was to be conclusively identified as a White Wagtail, was observed regularly until 8 February. In December 2007, and in April 2008, the observers examined and photographed skins of White and Pied Wagtails in the Natural History Museum, Tring. They concluded that the following three features enabled the White Wagtails to be reliably separated from Pied: (i) the black or dark coloration of the head never extends beyond the nape; (ii) the rump is grey, sometimes dark grey, never black as in *yarrelli*; (iii) the underparts are strikingly white with little or no visible grey on the flanks; and, in addition, (iv) females with a strong supercilium similar to those in *flava* wagtails are very probably White Wagtails. White Wagtails seen in Britain are considered to be from breeding populations in Greenland, Iceland and the Faroes on passage to and from their wintering areas in subtropical Africa. Some have wintered, even bred, in Britain. These experiences raised two questions, in what numbers are White Wagtails wintering in Britain, and are they being overlooked by observers? As a result of climate change, might we expect the numbers wintering to increase?

The next talk featured a report by **Katrina Cook** on a recent field trip to Mozambique, as part of a Darwin Initiative expedition hosted by the Royal Botanic Gardens, Kew. Katrina was invited to assemble a small collection of bird specimens for the collections at Tring and Maputo. Racked by several decades of civil war, Mozambique has remained largely untouched by scientists for much of the 20th century. This expedition, to Mt. Namuli, followed in the footsteps of Col. Jack Vincent who collected birds for what was then the British Museum (Natural History) 75 years ago. Teams of porters, unstable bridges and specimen preparation conditions bore a remarkable similarity to the 1930s trip—the notable exception being the absence of man-eating lions! Namuli has globally significant populations of four restricted-range taxa and is the only known locality of Namuli Apalis *Apalis lynesi*. Katrina is returning to Mozambique in October 2008 to collect birds in the previously unexplored Mt. Mabu region.

Michael Casement then outlined and illustrated a recent cruise to the Antarctic. His aim was to demonstrate the remarkable flexibility of modern digital cameras to record identification details of albatrosses and other seabirds in flight. From the stern of the ship, he spent more time looking through his lens than his binoculars. He also showed images of two aberrant forms of penguins. An unusual melanistic Chinstrap Penguin *Pygoscelis antarctica* was photographed on Half Moon Island, Antarctica, on 11 January, by Christopher Wilson. Two 'leucistic' Gentoo Penguins *P. papua* were sighted on 13 January at Waterboat Point, both sharing nesting duties with 'normal' mates (a photograph of one is on the BOC website for the meeting). In correspondence following this, Katrina Cook forwarded the images to Hein van Grouw, Senior Collection Manager at The National Museum of Natural History Naturalis, Leiden, who has studied such mutations. He concluded that the Chinstrap was indeed melanistic, but the Gentoo was not a leucistic mutant, but showed evidence of the mutant Brown, an aberration that normally occurs only in females. He wrote: 'The mutant Brown is widespread and is one of the most common aberrations in birds, and in several penguin species Brown is reported (sometimes called Isabella)'.

The final talk was given by **Martin Gauntlett** who asked *Why can't the experts agree?* The BOU and the Association of European Records Committees have recently accepted the splitting of the European Herring

Gull from the American one, but the AOU, presumably considering the same information, have rejected that split. A particularly tangled problem involves some of the *Anthus* pipits where up to ten taxa have been considered as species, the first eight all being part of the Richard's Pipit complex at some time. The authorities consulted, in order of publication, are: HM1 (first edition of Howard & Moore, HM2 the second and HM3 the third edition), S&M (Sibley and Monroe), *BoA* (the relevant volume of the *Birds of Africa*), *HBW* (the relevant volume of the *Handbook of the birds of the world*), IOC (Gill & Wright's world list on behalf of the IOC, which uses HM3 as its starting point), and BLI (the world list on the BirdLife International website). Martin used a table to illustrate his points. In the 1980s, just about all taxa were considered under *A. novaeseelandiae*, but S&M recognised seven species. Their specific recognition of Cameroon Pipit *A. camaroonensis* has not been followed subsequently. S&M also recognised Woodland Pipit *A. nyassae* as distinct from Long-billed Pipit *A. similis*. *BoA*'s only split within the Richard's Pipit complex was Mountain Pipit *A. hoeschi*. HM3 split New Zealand Pipit *A. novaeseelandiae* from Australasian Pipit *A. australis* (unlike S&M), but this seems unlikely to be the 'end of the story' because several forms on remote islands, such as the Campbell group, look rather different. HM3 also does not recognise Paddyfield Pipit *A. rufulus*, it being lumped in Richard's Pipit, despite being the size and shape of a Meadow Pipit *A. pratensis*. HM3 also 'lumps' Jackson's Pipit *A. latistriatus*, within African Pipit *A. cinnamomeus*. *HBW* 'lumps' the New Zealand forms within Australasian Pipit but accepts the other splits except Cameroon Pipit (lumped with African Pipit). The IOC gives English names to everything except Cameroon Pipit. BLI ploughs its own furrow. It does not recognise New Zealand Pipit as distinct from Australasian, the African forms except Mountain Pipit are 'lumped' in *richardi*, and nor does it recognise Woodland Pipit. As for Jackson's Pipit, it lumps northern forms with Richard's Pipit and southern forms with Long-billed Pipit. Kimberley Pipit *A. pseudosimilis*, which was described in the *Bulletin*, has been accepted by most subsequent authors, but not BLI, which goes to some length to dispute the evidence. Depending on taxonomy, there are 1–10 species involved, with 21st century systematics indicating anything from four to nine.

Alfred Russel Wallace (1823–1913): an ornithological celebration

405441-1001

An illustrated talk by the Revd. Tom Gladwin to a meeting of the British Ornithologists' Club held at the Natural History Museum, Tring, on Saturday 21 June 2008

Tom Gladwin had offered this talk in the belief that the Club should celebrate and thereby mark two 150th anniversaries, especially the reading of the first paper on natural selection by Alfred Russel Wallace and Charles Darwin at the Linnean Society on 1 July 1858. The other anniversary being the founding in the same year of the British Ornithologists' Union (BOU), the Club's 'parent', with which through common membership, a partly shared administration, and the Joint Publications Committee, it continues to enjoy a warm relationship. The meeting was appropriately held at the Natural History Museum, Tring, where an important assemblage of skins obtained by Wallace, including many type specimens, are held.

Wallace was born in Usk on 8 January 1823. Educated at Hertford Grammar School he found Latin the 'most painful' of the subjects he was taught, but he acknowledged, in *My Life* published in 1905, that it later enabled him 'to understand the specific descriptions of birds and insects'. There are several memorials to him in Hertford, where but for the action of his brother John he might have drowned.

In 1844 he met the entomologist Henry Bates. They became close friends and in 1848 departed on an expedition to collect in northern Brazil. Bates concentrated on the Amazon, and Wallace, the first European to do so, on the rio Negro and its tributaries. Illness decided Wallace to return in 1852. Unfortunately the *Helen* on which he sailed caught fire and his collections were destroyed. Earlier consignments of specimens received by his agent Samuel Stephens had been sold to finance the expedition. The account of his travels in South America, *A narrative of travels on the Amazon and Rio Negro*, published in 1853, reveals that he was already giving thought to the nature of speciation and the factors limiting a species' distribution.

In April 1854 Wallace arrived in Singapore at the start of his expedition to the Malay archipelago. In eight years he was to travel 14,000 miles and obtain 125,660 specimens including 8,000 birds.

In Sarawak in 1855 Wallace wrote the paper entitled 'On the Law which has Regulated the Introduction of New Species' (*Ann. & Mag. Nat. Hist.* 16: 184–196). It ended with the now famous words known as the Sarawak Law 'every species has come into existence both in space and time with a pre-existing closely allied species'. The paper was brought to Charles Darwin's attention by Sir Charles Lyell and, in 1856, possibly sensing he might lose his priority, Darwin drafted the first two chapters of what was to be come *The origin of species*.

In January 1858, whilst in the Spice Islands, Wallace wrote his famous Ternate paper, 'On the Tendency of Varieties to Depart Indefinitely from the Original Type'. This he sent to Darwin who passed it to Lyell together with the copy of an essay he had written in 1844. On 1 July 1858 these were read by Lyell and Joseph Hooker to a meeting of the Linnaean Society of London (*Proc. Linn. Soc. Zool.* 3: 53–62). As Darwin acknowledged, Wallace had independently discovered the theory of natural selection and was the first person to write a paper for publication on it.

In 1857 a group of ornithologists who had been meeting for some years resolved 'to establish a Magazine devoted entirely to Ornithology'. Thus the BOU was founded in 1858. In that year Philip Sclater, the first editor of *Ibis*, had a paper on 'The Geographical Distribution of Birds' published by the Linnean Society. On reading it Wallace wrote to Sclater who had been appointed the first editor of *Ibis*. The letter (*Ibis* 1: 449–454, 1859) mostly dealt with the separation of the Indian (Oriental) and Australian regions. He suggested the divide, known as the Wallace Line, be drawn through the 25 km-wide Makassar Strait between Bali and Lombok, between Celebes and Borneo, and between the Moluccas and the Philippines. As he stated 'Barbets reach Bali but not Lombok; *Cacatua* and *Tropidorhynchus* reach Lombok but not Bali. *Cacatua*, *Trichoglossus* and *Scythrops* in Celebes but not in Borneo.' His monumental work, which confirmed him as the father of zoogeography, *The geographical distribution of animals*, was published in 1875.

It was Sclater, the Club's first chairman, who met Wallace at Waterloo Station on his arrival from New Guinea on 1 April 1862. Wallace had brought with him two Lesser Birds-of-Paradise *Paradisaea minor* which, much to Sclater's surprise 'had actually reached London alive' (*Bull. Brit. Orn. Cl.* 23: 3).

Wallace died on 7 November 1913. Obituaries in *Ibis* and the Bulletin were among the many tributes paid to him. Buried at Broadstone (Dorset), he is commemorated by a memorial plaque on the floor of Westminster Abbey. At the service of dedication the Dean of Westminster said 'as is so often observable in true greatness, there was in him an entire absence of that vanity and self-advertisement which are not infrequent with smaller minds—it is great men who work for the work's sake without regard to recognition and who achieve greatness in spite of themselves'.

In pursuit of his studies Wallace had travelled in excess of 20,000 miles. His publications comprised 22 books, 508 scientific papers, and 239 other articles and reviews. In the Malay archipelago alone he discovered over 1,000 animal species new to science. Some of these, including the spectacular Wallace's or Standardwing Bird-of-Paradise *Semioptera wallacii* and 11 other bird species, are named after him.

Wallace was widely honoured in his lifetime. He was elected an Honorary Member of the BOU in 1860, a Fellow of the Royal Society in 1893, and in 1908 was presented with the first Darwin–Wallace Medal on the 50th anniversary of the Linnean Society meeting of 1 July 1858. He also received Honorary Degrees from Dublin and Oxford universities and the Order of Merit in 1908.

After the talk, those present moved into the NHM bird collection, where Tom Gladwin illustrated points he had made by reference to specimens collected by and / or named after Wallace. Thereafter, Robert Prŷs-Jones used a selection of specimens that Wallace collected in Sarawak between late 1854 and early 1856 to illustrate research, based on comparative analysis of Wallace's field notebooks and specimen labels, which he and Lord Cranbrook are undertaking into the development of Wallace's ornithological knowledge.

During the meeting the Club, recognising its great contribution to ornithology, resolved to send its greetings and congratulations to the BOU as it celebrated its 150th year.

405448-1001

Derek Goodwin 1920–2008

Many BOC members will have been saddened to learn of the death of Derek Goodwin on 14 May, at the age of 88. Following army service in North Africa, Derek applied his life-long passion for birds by joining the 'Bird Room' staff in October 1946, and he worked his way up to Experimental Officer (1954) and latterly Principal Scientific Officer. He became a familiar face and friend to all who visited the bird collections.

Derek's writings and contributions to ornithology have already been covered in the national press, and other publications, but a few personal memories of this very remarkable and much-loved man are appropriate here. Derek wasn't a member of the BOC: Effie Warr suggests he didn't care for joining clubs, or attending meetings. He preferred to leave work on the dot and go home to his living birds, which he kept in a small upstairs room, with an observation hole cut into it.

I came to know Derek personally, as he was my mentor at RN College, Greenwich, in 1953, where I had to undertake a study of a non-naval subject, and I chose 'ornithological evolution and speciation'. This involved me travelling to the Bird Room, at South Kensington, where Derek took me in hand, and also introduced me to many distinguished visitors; I vividly recall the imposing figure of Col. Meinertzhagen. Derek subsequently proposed my membership to the BOU, and we kept in touch spasmodically over many years. He was a lovely man and a special friend to all who came to know him, both professionals and enthusiastic amateurs like me.

Michael Walters worked closely with him during the transfer of the collections to Tring: 'Derek Goodwin was probably one of the most underrated ornithologists of the 20th century, largely because he was so self-effacing that few who came into contact with him were aware of his full value. I worked closely with him from 1970 onwards during the packing and transportation of the bird collections from South Kensington to their new location at Tring. The first two years of my work in the Bird Room involved the packing of the collections, a process not without trauma to all of us. I recall that I once said to Derek, "do you ever dream that one day you'll come in and find that all this transportation is a dreadful nightmare and that everything is as it was before?". He agreed that such an event would be a revelation. During the early years after moving to Tring, he and I would arrive at 08.15 at Tring station (we were the only staff members to commute from south London) and walk to the museum, rain, hail or shine. None of the other, then current, staff ever understood the camaraderie that developed between us during those years.'

'Derek's knowledge of birds was incredible. He handled and came to have a detailed knowledge of practically every specimen in the collection, and had expertise in all groups of birds, not merely the three families—crows, pigeons and waxbills—on which he published monographs. The many papers he published give no indication of the breadth of his knowledge, much of which has perished with him. One function of the bird section was to identify feathers sent in by members of the public, and Derek was an expert in this field. On one occasion several staff spent a whole morning checking unsuccessfully everything they could think of. Finally, in despair, they asked Derek, who took one look at the feathers and said: "Have you tried undertail-coverts of Golden Eagle?". It proved to be correct.'

'Derek was modest to a fault. Before retiring he destroyed most of his personal correspondence because it never occurred to him that it could possibly be of any interest. He handed over a few selected letters with 'great' ornithologists, never thinking that he might be held in equal regard. He attended his own leaving party with the greatest reluctance; it was, I think, an ordeal he would rather not have endured.'

Effie also recalls 'Derek transferred to Tring in 1971 but decided to continue travelling from his home in Herne Hill. He took part in the third Harold Hall expedition to Australia collecting birds for the museum but I suspect he didn't enjoy the collecting part very much. We went several times to his Herne Hill home where he cooked supper for us—always chicken and Malaga wine I remember. He worked at Tring until his retirement in 1982, and subsequently moved to Petts Wood.'

Derek's legacy to the ornithological community is an impressive list of scientific papers and books, and a wide circle of friends who will miss him greatly.

Michael Casement

Geographical variation in Slate-crowned Antpitta *Grallaricula nana*, with two new subspecies, from Colombia and Venezuela

by Thomas M. Donegan

Received 19 April 2007; final revision accepted 15 July 2008

Slate-crowned Antpitta *Grallaricula nana* is a small member of the Grallariidae found in the northern Andes. The song of most populations has been sound-recorded (Appendix 1) and some ecological data have been published (Delgado 2002, Greeney & Sornoza 2005, Greeney *et al.* 2008, Niklison *et al.* 2008), but no detailed revision of its taxonomy has been attempted. Six subspecies of *G. nana* have been described from eastern Venezuela to northern Peru, with a disjunct population in the tepui region of southern Venezuela and Guyana (Krabbe & Schulenberg 2003). Subspecies are considered separable by the extent of white on their otherwise red-orange underparts, the colour saturation of the underparts and upperparts and eye-ring pattern (Figs. 1–7). It has recently been suggested that one of the Venezuelan populations might warrant species rank based on plumage and voice (Ridgely & Tudor 1994, Boesman 1999). Separately, recent range extensions (i.e. new populations) in Colombia (Andrade & Lozano 1997, Salaman *et al.* 2002, Cuervo *et al.* 2003, Krabbe *et al.* 2006, Echeverry & Córdoba 2007, Donegan *et al.* 2007) mandate a re-evaluation of subspecific taxonomy. In particular, the nominate subspecies has recently been considered to encompass all Andean populations from Venezuela to Peru (Krabbe & Schulenberg 2003), but published voice recordings (Appendix 1; Figs. 10–12) evidence substantial geographical variation within this region.

Grallaricula is currently treated, together with most other antpitta genera, in the family Grallariidae (Irestedt *et al.* 2002, Chesser 2004, Rice 2005a,b, Remsen *et al.* 2008). Many species of antpitta occur in montane regions, and individuals probably possess poor dispersal abilities, being unable to cross low valleys of unsuitable habitat. *Grallaricula* are secretive understorey birds that are more frequently heard than seen. Within the Neotropics, these factors have contributed to the family probably being second only to Rhinocryptidae in the number of new taxa described recently, as previously unknown populations have been discovered and sound-recorded (Graves *et al.* 1983, Graves 1987, Schulenberg & Williams 1992, Stiles 1992, Krabbe *et al.* 1999).

Two subspecies of *G. nana* are described from Colombia: *G. n. nana* (Lafresnaye, 1842) and *G. n. occidentalis* Todd, 1927. The latter was recently considered a synonym of the nom-

Captions to figures on opposite page

Figure 1. *G. n. hallsi* holotype, Serranía de los Yariguíes, Colombia, January 2005 (Blanca Huertas / Proyecto EBA)

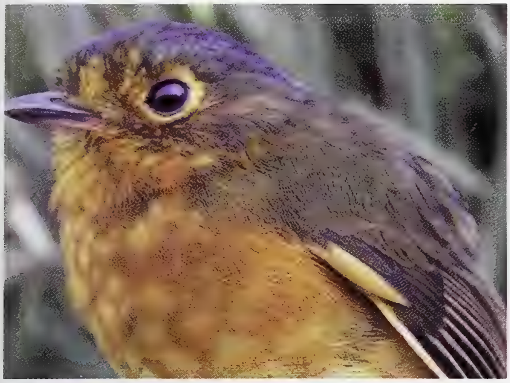
Figure 2. Immature *G. n. nanitaea*, Suratá, dpto. Santander, Colombia (Jorge E. Avendaño-C.)

Figure 3. *G. n. pariae*, Cerro Humo, Sucre, Venezuela (Joseph A. Tobias)

Figure 4. BMNH specimens, showing geographical variation in *G. nana*, from left to right: (i) *G. n. pariae* (1951.1.2, formerly COP 44254, paratype); (ii) *G. n. kukenamensis* (89.7.10.926, holotype); (iii) *G. n. olivascens* (1915.3.16); (iv) *G. n. nana* (89.9.10.927); and (v) *G. n. occidentalis* (89.7.10.956) (Thomas M. Donegan, © Natural History Museum, Tring)

Figure 5. ICN specimens, from left to right: (i) *G. n. occidentalis* West Andes population (25920); (ii) *G. n. nana* (31322); (iii) *G. n. hallsi* (35555, paratype); (iv) *G. n. hallsi* (35195, holotype); (v) *G. n. hallsi* (35193, paratype); and (vi) *G. n. nanitaea* Tamá population (33933, formerly IAVH 10645) (Thomas M. Donegan)

A



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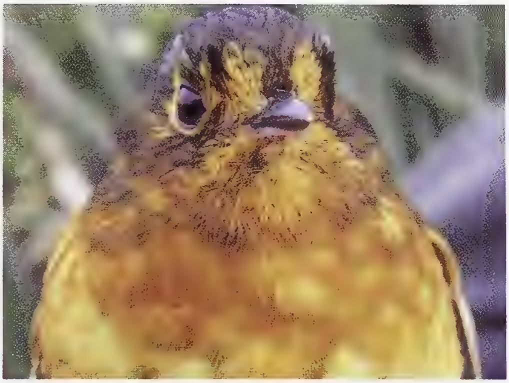

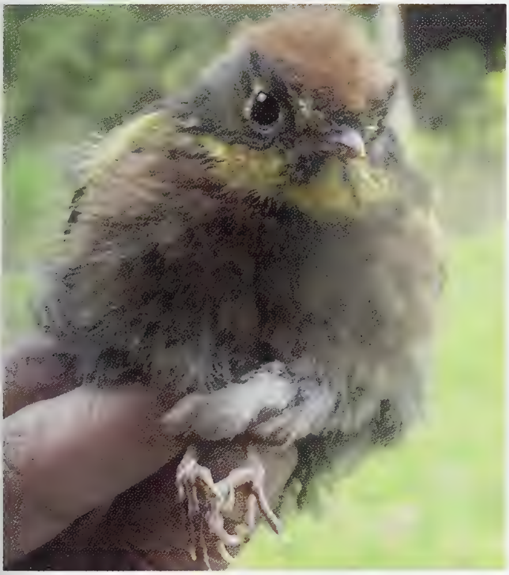

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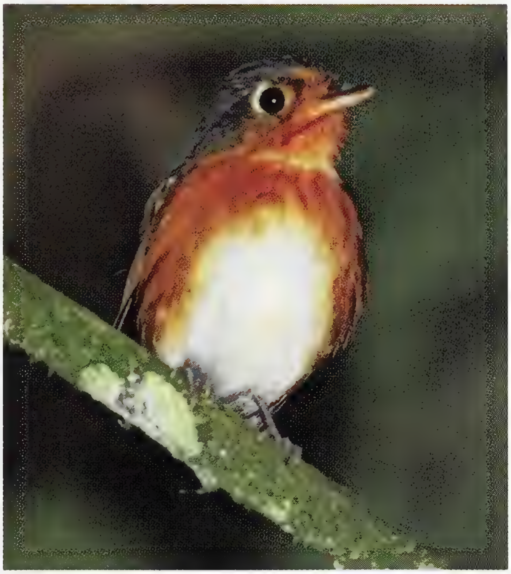

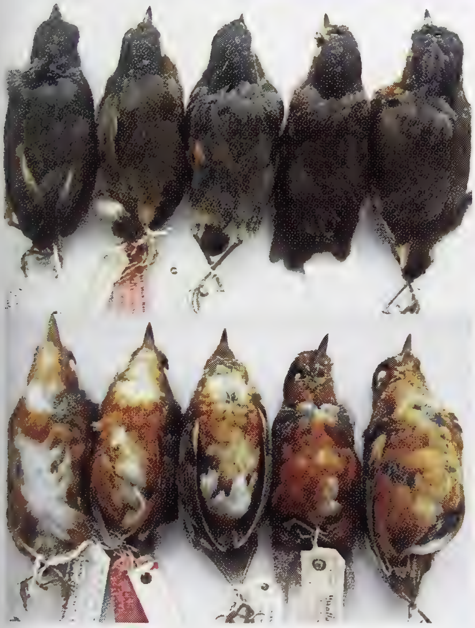

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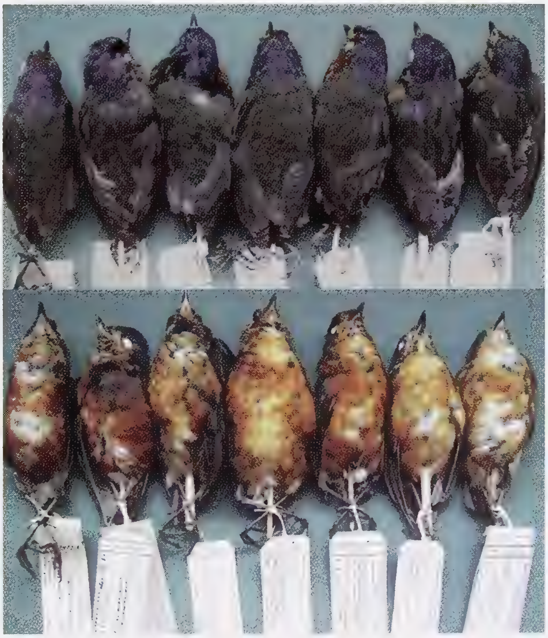


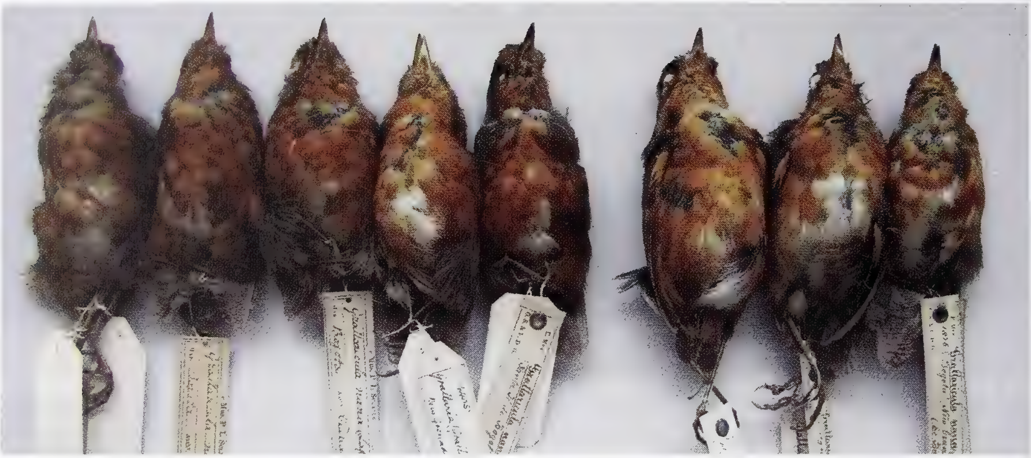


Figure 6. Series at BMNH showing differences in underparts plumage saturation between *G. n. nana* and *G. n. occidentalis*: at left five *G. n. nana*, from left to right (i) 44.12.31.21, (ii) 89.9.20.652, (iii) 89.9.20.651, (iv) 54.1.25.81, (v) 89.9.10.927; at right three *G. n. occidentalis*, from left to right (vi) 89.7.10.956, (vii) 89.7.10.929, and (viii) 89.7.10.928 (Thomas M. Donegan, © Natural History Museum, Tring)

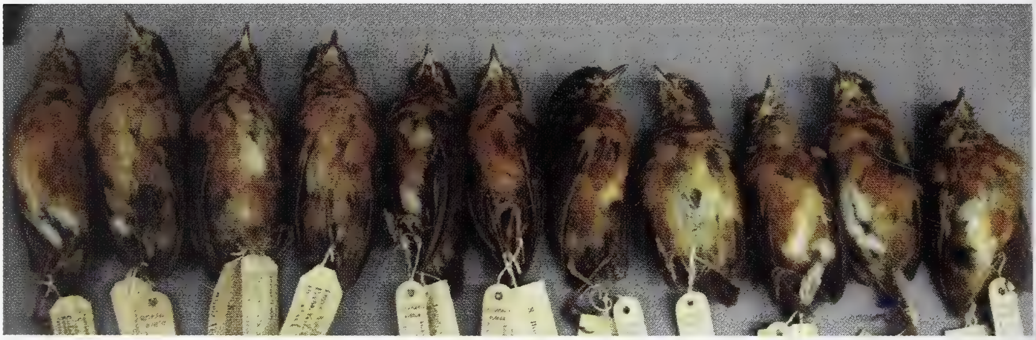


Figure 7. AMNH series of *G. n. nanitaea*, left to right: (i) 96305 (paratype); (ii) 492316; (iii); 146661 (holotype); (iv) 100209; (v) 492312; (vi) 492311; (vii) 492313; (viii) 492318; (ix) 492315; (x) 492317 (paratype); and (xi) 492314 (Thomas M. Donegan)

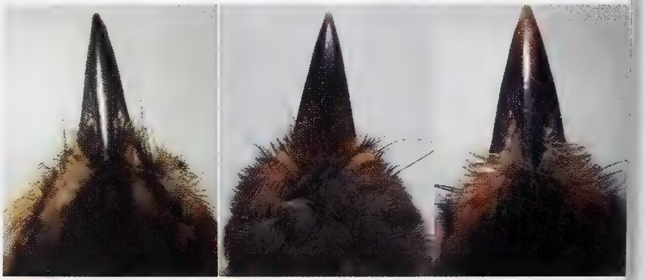


Figure 8. Bill morphology of (left to right): (i) *G. n. olivascens* BMNH 1915.3.16; (ii) *G. n. kukenamensis* BMNH 89.7.10.926; and (iii) *G. n. pariae* BMNH 1951.1.2 (Thomas M. Donegan, © Natural History Museum, Tring)

inate because West Andean and Ecuadorian specimens possess similar plumage (Krabbe & Schulenberg 2003). The other described subspecies all occur in Venezuela and Guyana: *G n. olivascens* Hellmayr, 1917, of the Coastal Cordillera, *G. n. cumanensis* E. J. O. Hartert, 1900 of the Caripe Mountains, *G. n. pariae* Phelps & Phelps Jr., 1949, of the Paria Peninsula, anc *G. n. kukenamensis* Chubb, 1918, of the tepuis.

Methods

Specimens of *G. nana* and other *Grallaricula* species were studied at the following institutions: American Museum of Natural History, New York (AMNH); Natural History Museum, Tring (BMNH); Colección Ornitológica Phelps, Caracas (COP); Instituto Alexander von Humboldt, Villa de Leyva, Colombia (IAVH); Instituto de Ciencias Naturales, Universidad Nacional, Bogotá (ICN); Museo de Historia Natural, Universidad de la Salle, Bogotá (MLS); and Muséum National d'Histoire Naturelle, Paris (MNHN). Details of other Colombian specimens were taken from Project Biomap (www.biomap.net). Photographs of specimens in the Biomap database held at the following museums were studied: Academy of Natural Sciences, Philadelphia (ANSP); Carnegie Museum of Natural History, Pittsburgh (CM); Museum of Comparative Zoology, Cambridge, MA (MCZ); Field Museum of Natural History, Chicago (FMNH); and Los Angeles County Natural History Museum (LACM). A list of specimens inspected and their localities, which includes type specimens of almost all taxa, is presented in Appendix 1.

The following measurements were taken for each specimen: wing-chord and tail length (to nearest 0.5 mm), tarsus length, culmen length from skull to tip of upper mandible and bill width at mid-point of the nostrils (to nearest 0.5 mm) and, from specimen labels, mass (g) data were also obtained. Data from birds in juvenile plumage, moulting from juvenile to adult plumage, or otherwise in moult were excluded from analyses. Juvenile and immature specimens are easily identified in *G. nana* by the presence of patchy dark rufous feathering. Due to time constraints and the number of specimens, only a sample of *G. n. pariae* material at COP was measured, but others were inspected. Biometric data are presented in Appendix 2.

Vocalisations in suboscines, such as *Grallaricula*, are considered innate and stereotypical (Kroodsma 1984), and in another high-elevation Andean suboscine genus, *Scytalopus*, these provide a better reflection of molecular differences than plumage characters (Arctander & Fjeldså 1994). Vocal differences between populations may therefore have a genetic basis and can inform taxonomy (e.g. Isler *et al.* 1997, 1999, 2006, 2007, 2008, Krabbe & Schulenberg 1997). To assess taxon rank, a combination of morphological and vocal evidence is often considered helpful under a modern interpretation of the Biological Species Concept (Helbig *et al.* 2002).

Published and unpublished sound-recordings of *G. nana* were studied. For comparison, Venezuelan recordings of nominate Rusty-breasted Antpitta *G. ferrugineipectus*, Crescent-faced Antpitta *G. lineifrons* and presumed recordings of Hooded Antpitta *G. cucullata* were also studied (Appendix 3). These taxa were chosen because they have structurally similar songs to *G. nana* taxa and do not present significant taxonomic issues (*cf.* Ecuadorian and Colombian *G. ferrugineipectus*). Sonograms were generated using the default settings of Raven Lite 1.0, sometimes adjusted for brightness and expanded to show at least the detail in Figs. 10–12. Audacity 1.2.6 was used to remove 'noise' from some recordings. Both the loudsong (*sensu* Willis 1967, hereafter 'song') and calls were analysed. Data from songs that were curtailed (e.g. *G. n. olivascens*) were ignored. If calls were combined with songs, or elaborate introductory or terminating sequences were included with songs (e.g. some recordings of *G. lineifrons* and *G. ferrugineipectus*), such calls or sequences were excluded. Songs and calls were defined as sequences of notes broken by gaps significantly longer than the intervals between individual notes of a sequence. Multiple songs and calls were measured from single recordings and localities, where available, to determine the full range of variables. Recordings of individuals under natural conditions and after playback were

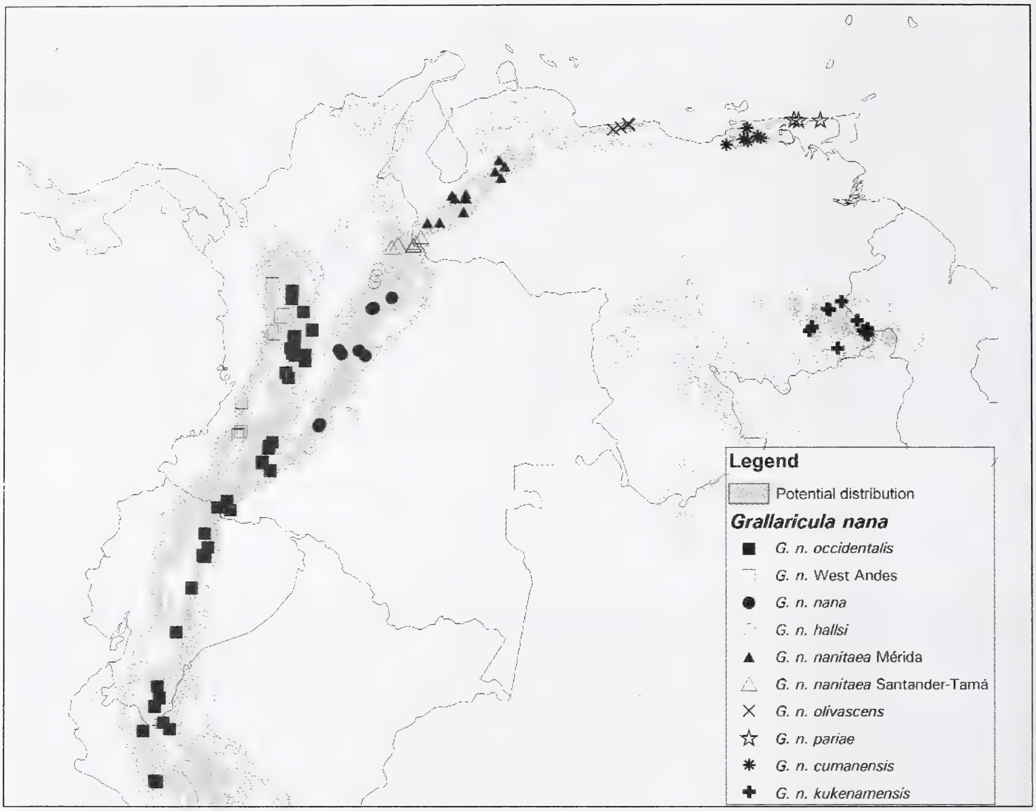
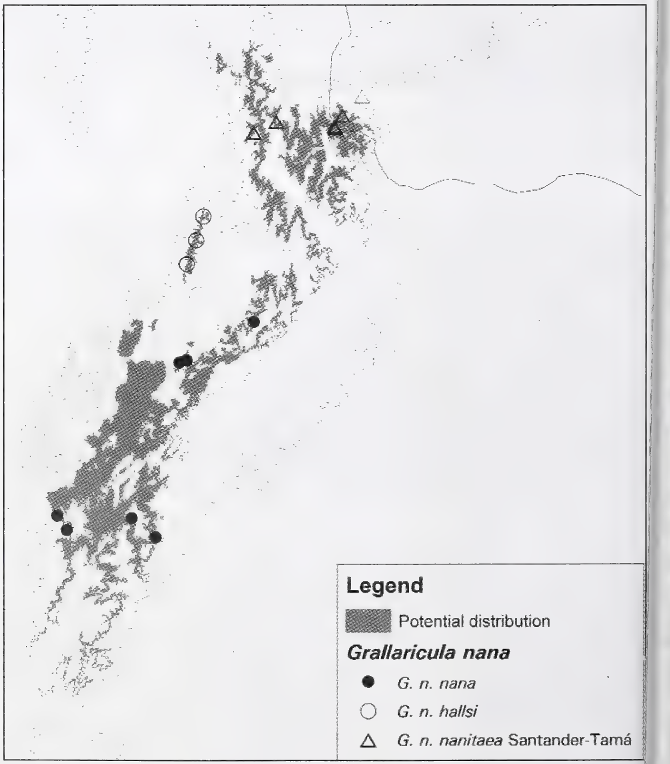

Legend
Potential distribution
Grallaricula nana
G. n. occidentalis
G. n. West Andes
G. n. nana
G. n. hallsi
G. n. nanitaea Mérida
G. n. nanitaea Santander-Tamá
G. n. olivascens
G. n. pariae
G. n. cumanensis
G. n. kukenamensis

Figure 9. Potential distribution maps using MAXENT 3.0 (Phillips *et al.* 2006) based on topography and climate layers available from Worldclim (Hijmans *et al.* 2005) showing records of *G. nana* taxa.

A (above). All *G. nana* populations. Potential distribution is based on three analyses: (i) *nana* group; (ii) *cumanensis* group; and (iii) *kukenamensis*. The potential range of the species includes unsuitable sites (e.g. west slope of the Andes in Ecuador and lower elevations) probably due to inaccurate locality data for older specimens.

B (right). Three Eastern Cordillera *G. nana* taxa only, including the two new subspecies described in this paper.


Legend
Potential distribution
Grallaricula nana
G. n. nana
G. n. hallsi
G. n. nanitaea Santander-Tamá

included for the same reason. Data on numbers of recordings and sonograms are presented for each taxon in Appendix 3. Appendix 1 contains a gazetteer of recording localities.

Various vocal variables described by Isler *et al.* (1997, 1999, 2006, 2007, 2008) were considered for further analysis during a preliminary study of sonograms. Variables that showed variation between populations were analysed further, whilst apparently constant variables and those inappropriate for study were not. For example, as calls and songs comprise a number of individual notes at the same volume but different acoustic frequency, acoustic frequency variables defined with reference to a 'principal' note were not amenable to study. Measurements of frequency bandwidth were avoided because individual notes in the songs of several populations show short, quiet 'tails' on sonograms (Figs. 10–11), meaning that the lowest or highest recorded point is biased by the quality of the recording equipment and distance of the bird from the microphone. The maximum point of the note excluding such tails, or the maximum point of an up–down stroke, provide a more consistent reference point for these birds. Finally, calls of *G. n. pariae* and *G. n. cumanensis* comprise a series of fast trills, which were analysed separately, both for series of trills and for each individual trill.

Data for the following variables were analysed: (i) number of notes in song; (ii) total song duration (seconds); (iii) mean number of notes per second (by dividing i and ii); (iv) maximum acoustic frequency of highest note (kHz); (v) maximum acoustic frequency of lowest note (kHz); (vi) variation in acoustic frequency (kHz) (by calculating iv minus v); (vii) time of peak in frequency (measured from the start of the song until the midpoint of the highest frequency—if various notes shared the peak frequency the middle note was used); (viii) position of peak within call (calculated as vii divided by ii); (ix) note length at start (time from the start of the second note to the start of the third, ignoring 'rasping' notes); (x) note length at end (time from the start of the penultimate note to the start of the last, ignoring 'rasping' notes); (xi) change of pace (calculated as viii divided by ix); and (xii) subjective description of individual note shape. Individual notes in songs generally appear as 'blobs' or up–down strokes (chevrons). 'Blobs' were often skewed into a rounded parallelogram or u / n shape, and were classed as flat (no or marginal skew), up (left side lower than right), down (left side higher than right), 'n' ('tails' of decreasing frequency at start and end) or 'u' ('tails' of increasing frequency at start and end).

Of these variables, the following were discarded as being correlated with or dependent upon other variables: (v), (vii), (ix) and (x). For diagnosability analyses (Appendix 4) and mean and standard deviation (Appendix 3), a reduced dataset comprising the first three sonograms with complete data available for each recording was used. An edited dataset alone was compiled for those species studied only for comparative purposes.

To analyse species and subspecies limits, biometric and vocal data were subdivided on the basis of plumage differences and well-known biogeographic regions for montane birds: (i) tepuis; (ii) Paria Peninsula, Venezuela; (iii) Caripe Mountains, Venezuela; (iv) Coastal Cordillera, Venezuela; (v) Mérida Andes, Venezuela; (vi) Tamá–Santander region, northern East Andes of Colombia; (vii) Serranía de los Yariguíes, East Andes, Colombia; (viii) East Andes of Colombia north of the Picachos depression; (ix) East Andes of Colombia south of the Picachos depression; (x) 'Nudo de Pasto' region in dptos. Cauca / Huila where Central and East Andes join; (xi) Central Andes, Colombia north of dpto. Huila; (x) West Andes, Colombia; (xii) Ecuador and Peru (subdivision into Ecuador and southern Ecuador / Peru recordings having revealed no vocal differences).

Statistical tests.—Various diagnosability tests were made for pairs of vocal and biometric variables of these populations, as follows.

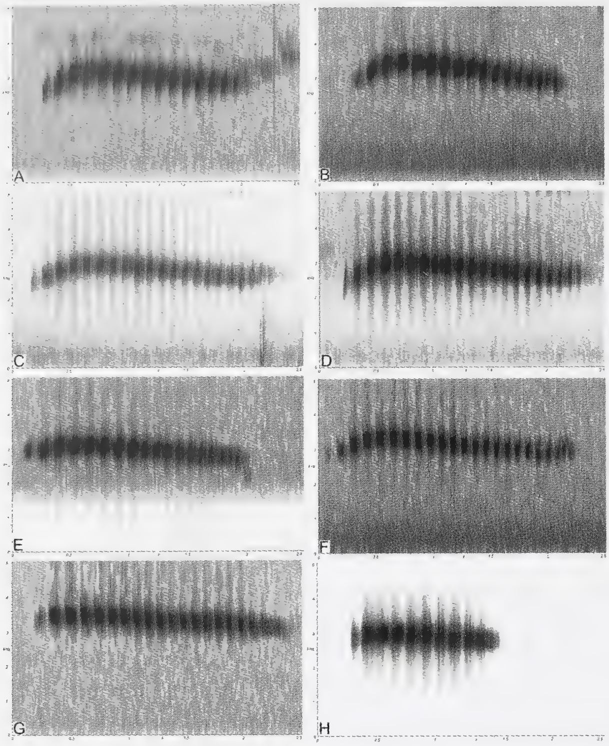


Figure 10. Sonograms of songs of Colombian, Ecuadorian and Peruvian *G. nana* populations: (a) *G. n. occidentalis* (Cabañas San Isidro, Ecuador: N. Athanas: XC 5060); (b) *G. n. occidentalis* (Cerro Chinguela, Peru: T. A. Parker *in* Isler & Whitney 2002); (c) *G. n. occidentalis* (Rogitama, Colombia: M. Álvarez: IAVH 10442); (d) *G. n. nana* (Serranía de los Picachos, Colombia: Álvarez 2000); (e) *G. n. occidentalis* (Río Blanco, Caldas: Álvarez & Córdoba 2000); (f) *G. n. occidentalis* population in West Andes (Páramo Frontino, Colombia: N. Krabbe); (g) *G. n. nanitaea* Tamá, Colombia (Córdoba & Álvarez 2003); (h) *G. n. hallsi* (Serranía de los Yariguíes, Colombia: T. M. Donegan: XC 21498), with noise removal using Audacity.

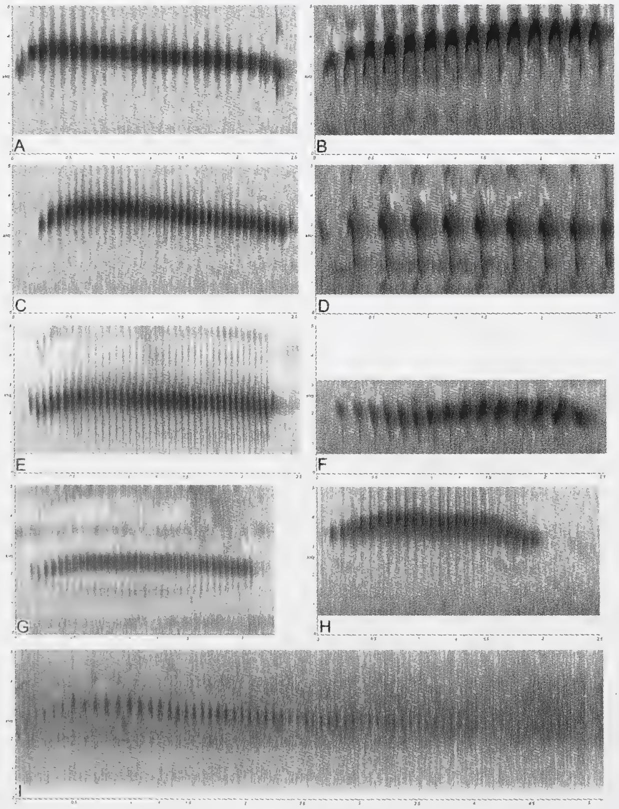


Figure 11. Sonograms of songs of Venezuelan subspecies of *G. nana* (at left) and other *Grallaricula* species (right): (a) *G. n. nanitaea* Mérida (Páramo Zumbador: P. Schwarz); (b) *G. lineifrons* (Cerro Mongus, Carchí, Ecuador: Krabbe & Nilsson 2003); (c) *G. n. olivascens* (Colonia Tovar: P. Schwarz); (d) *G. ferrugineipectus* (Utuana, Loja, Ecuador: Krabbe & Nilsson 2003); (e) *G. n. cumanensis* (Piedra de Moler: C. A. Marantz); (f) *G. f. ferrugineipectus* (Serranía de San Luis, Venezuela: Boesman 1999); (g) *G. n. pariae* (Paria Peninsula: Boesman 1999); (h) probable *G. cucullata* (upper río Yurayaco, Colombia: M. Álvarez: IAVH 4260); (i) *G. n. kukenamensis* (upper Escalera: P. Boesman, recording identified as '80%' certain). Some frequency bandwidths removed to delete calls of other species and low-frequency 'noise'.

LEVEL 1: statistically significant differences at $p<0.05$. A Bonferroni correction was applied for both vocal data (seven variables) and biometrics (five variables), to produce $p<0.0071$ and $p<0.01$ respectively. For biometrics, acoustic frequency and other primary data, an unequal variance (Welch's) *t*-test was used; for speed and other derived or ratio data, both Kolmogorov-Smirnov and Mann-Whitney U tests were also applied to account for any non-normal distributions. The Level 1 calculation assesses statistical significance, but tolerates considerable overlap. Further calculations, described below, were undertaken to measure inter-population differences in the context of various species and subspecies concepts. In the formulae used below, $\bar{x}_1$ and s_1 are the sample mean and sample standard deviation of Population 1; $\bar{x}_2$ and s_2 refer to the same parameters in Population 2; and the t value uses one-sided confidence intervals at the percentage specified for the lower degree of freedom of the two populations for the relevant variable, with t_1 referring to Population 1 and t_2 referring to Population 2.

LEVEL 2: a '50% / 97.5%' test, following Hubbs & Perlmutter's (1942) now little-used subspecies concept, which is passed if sample means are two standard deviations or more apart, here defined as the sample mean of Population 1 falling outside the range of 97.5% of Population 2, controlling for sample size: $|(\bar{x}_1-\bar{x}_2)| > (s_1(t_{1\,@\,97.5\%}) + s_2(t_{2\,@\,97.5\%}))/2$.

LEVEL 3: The traditional '75% / 99%' test for subspecies (Amadon 1949, Patten & Unitt 2002), modified to control for sample size: $|(\bar{x}_1-\bar{x}_2)| > s_1(t_{1\,@\,99\%}) + s_2(t_{2\,@\,75\%})$ and $|(\bar{x}_2-\bar{x}_1)| > s_2(t_{2\,@\,99\%}) + s_1(t_{1\,@\,75\%})$.

LEVEL 4: diagnosability based on recorded values (first part of Isler *et al.*'s 1999 diagnosability test).

LEVEL 5: so-called '95% / 95%' diagnosability (i.e. 97.5%/97.5%, given that the lower 2.5% of each population is also outside the range of each population). This occurs when sample means are four standard deviations apart, controlling for sample size, and is the second part of Isler *et al.*'s (1999) diagnosability test: $|(\bar{x}_1-\bar{x}_2)| > s_1(t_{1\,@\,97.5\%}) + s_2(t_{2\,@\,97.5\%})$

For one taxon (*G. n. kukenamensis*) only a single sound-recording of the song and call was available (Fig. 11i), and this was identified with only 80% certainty by the recordist (P. Boesman *in litt.* 2008), based on its locality and resemblance in structure to *Grallaricula* songs. Songs of all other Grallariidae in the tepuis are known and none of those persons that is familiar with tepui avifauna consulted has proffered an alternative identification. The single-note call given prior to the song (Fig. 12m) also coincides with Braun *et al.*'s (2003) description and is similar to the single-note calls given by other *G. nana* taxa. However, the recording differs from unpublished recordings that are certainly of *G. n. kukenamensis* and which will be published elsewhere (D. Ascanio *in litt.* 2008), suggesting that *G. n. kukenamensis* may possess different calls. The following formulae were used to assess diagnosability of this single recording, where y is the relevant value for the *G. n. kukenamensis* recording; $\bar{x}_1$ and s_1 are the sample mean and sample standard deviation of the compared population; and the t value uses one-sided confidence intervals at the percentage specified for the lower degree of freedom of the two populations for the relevant variable. The tests were based on the assumption that the recording is of an individual with an unusual song at the highest or lowest 2.5 percentile for each variable studied: Level 2: $y < \bar{x}_1 - 2s_1t_{97.5\%}$ or $y > \bar{x}_1 + 2s_1t_{97.5\%}$ Level 4: diagnosability based on recorded values; Level 5: $y < \bar{x}_1 - 3s_1t_{97.5\%}$ or $y > \bar{x}_1 + 3s_1t_{97.5\%}$.

Helbig *et al.* (2002) suggested that, to assess the rank of allopatric populations, a comparison with closely related sympatric or parapatric populations known to be species should be undertaken. Isler *et al.* (1999) suggested assigning species rank to allopatric Thamnophilidae populations where three or more measured vocal variables for loudsongs differed diagnosably, based on observed differences between closely related sympatric

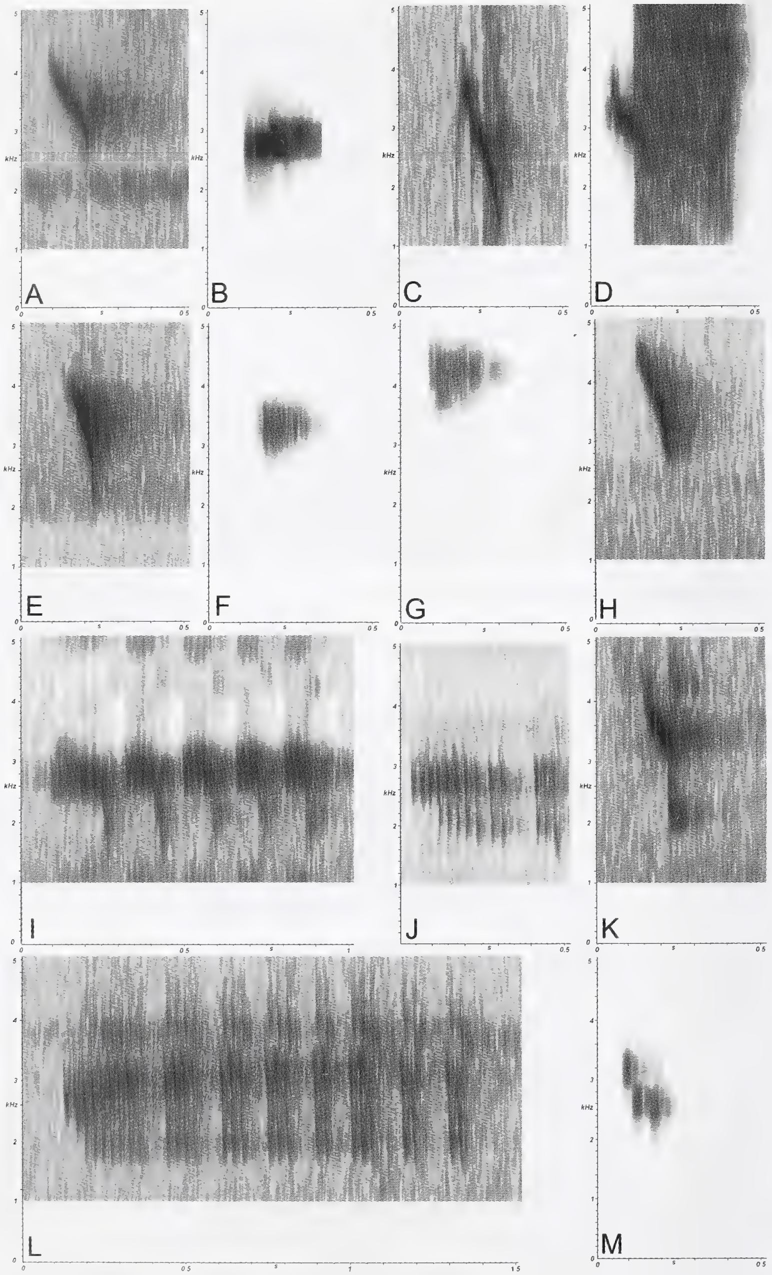


Figure 12. Sonograms of scolds of *G. nana* taxa: (a) *G. n. occidentalis* (Río Blanco, Caldas, Colombia: D. Calderón: XC 'Mystery' 300); (b) *G. n. occidentalis* (as A, XC 'Mystery' 306); (c) *G. n. hallsi* (holotype, Lepipuerto, Yariguíes, Colombia: T. M. Donegan: XC 21508); (d) *G. n. hallsi* (as C, in-hand distress call: T. M. Donegan: XC 21507); (e) *G. n. occidentalis* (Guacamayos, Napo, Ecuador: Krabbe *et al*. 2001); (f) apparent *G. n. nana* (Parque Nacional Natural Picachos, Caquetá, Colombia: M. Álvarez: IAVH 345); (g) apparent *G. n. nanitaea* (Tamá, Norte de Santander, Colombia: M. Álvarez: IAVH 11722); (h) *G. n. nanitaea* (Universidad de los Andes, Mérida, Venezuela: K. J. Zimmer); (i) *G. n. cumanensis* (Cerro Negro, Sucre, Venezuela: Boesman 2007); (j) *G. n. pariae* (Cerro Humo, Sucre, Venezuela: R. Innes); (k) *G. n. olivascens* (Colonia Tovar, Aragua, Venezuela: M. L. Isler); (l) *G. n. pariae* (Cerro Humo, Sucre, Venezuela: J. I. Areta); (m) *G. n. kukenamensis* (upper Escalera, Venezuela: P. Boesman, recording identified as '80%' certain). Recordings b, d, f, g and m with noise removal by Audacity.

species in that family. For Rhinocryptidae, a single diagnostic vocal difference separated sympatric taxa (Donegan & Avendaño-C. 2008). Various comparisons between sympatric or parapatric *Grallaricula* populations were undertaken. Isler *et al.*'s (1999) diagnosability tests (Levels 4 and 5, or for note shape Level 4) together with my test of statistical significance (Level 1) were met for: (i) nominate *G. ferrugineipectus* vs. Mérida Andes *G. nana* (three variables: song speed, highest frequency and position of peak in frequency); (ii) *G. lineifrons* vs. Ecuadorian *G. nana* (four variables: song speed, highest frequency, position of peak in frequency and note shape); and (iii) *G. cucullata* vs. *G. nana* in the East Andes of Colombia (three variables: song speed, highest frequency and note shape). I therefore propose ranking allopatric *Grallaricula* populations as biological species where they show Levels 1, 4 and 5 diagnosability (or Level 4 for note shape) for three or more variables in songs.

For subspecies, Isler *et al.* (2006, 2007) suggested a 'full diagnosability for one character' test (whether vocal, biometrics or plumage) to diagnose subspecies of Thamnophilidae (Level 4/5 for at least one variable: essentially a phylogenetic species with small differences). The traditional test in ornithology for diagnosing subspecies is the Level 3 '99%/75%' test. Stiles & Caycedo (2002) ranked an allopatric population with statistically significant means for different variables (my Level 1) subspecifically. Where allopatric populations meet Levels 1, 3 and 4/5 for at least one character (i.e. satisfy all subspecies definitions), I conservatively describe them as subspecies, and I propose synonymy only if allopatric populations fail to achieve any level of diagnosability (i.e. do not pass any subspecific definitions). Other putative subspecies are discussed but not described. This approach may produce inconsistency, because historically recognised but dubious taxa maintain their status, but similarly differentiated undescribed populations continue to lack nomenclatural status. However, this approach results in a high threshold for both new taxa and synonymisation treatments, thereby maintaining current taxonomic treatments for other populations pending molecular or other studies.

Geographical variation in the northern Andes

The Andean races *G. n. nana* and *G. n. occidentalis* present a taxonomic challenge due to the provenance of their types. Here, I briefly discuss geographical variation in *G. nana* in the northern Andes, before going on to assign available names to those populations to which they apparently refer. Specimen and vocal studies (see Appendices) suggest that the following populations within *G. n. nana* are differentiated to varying degrees, from west to east and south to north in turn. Differences are illustrated in Figs. 1–7.

(i) WEST ANDES.—Records in dptos. Cauca, Valle, Risaralda and Antioquia (Cuervo *et al.* 2003, Krabbe *et al.* 2006). A small white chest collar is present on many specimens, a feature reduced in adjacent regions. This population may show small differences in dorsal plumage between (paler) Central Andes and (darker) East Andes specimens (Fig. 5), but this is tentative and Central Andes / Ecuador specimens exhibit some variation in upperparts plumage. The song differs (mostly Level 1) from other Colombian populations in its duration, greater number of notes, greater frequency variation and greater change of pace (Appendix 4). The call is not known.

(ii) CENTRAL ANDES / ECUADOR / PERU.—Records in dptos. Caldas, Risaralda, Quindío and Antioquia, Colombia (Hilty & Brown 1986). In Ecuador and Peru, it occurs along the entire east slope south to dpto. Cajamarca (Fjeldså & Krabbe 1990, Ridgely & Tudor 1994, Ridgely & Greenfield 2001, Schulenberg *et al.* 2007). Specimens have on average paler, more orange underparts than those in the East Andes, and no significant white breast collar is evident (Fig. 6). The song in the Central Andes has been considered 'more plaintive' than in Ecuador (Krabbe & Schulenberg 2003), but my sample reveals the recording on which this comment was based (Álvarez & Córdoba 2002; Fig. 10e) to be atypical in acoustic frequency variation. Only small but statistically significant differences in acoustic frequency and bill width are evident between Central Andean and Ecuadorian populations, which are not separated by any known ecological divide. I found no differences in plumage or song between Central Andes and Ecuadorian populations.

(iii) EAST ANDES.—Records in dptos. Cundinamarca and Boyacá, Colombia (Andrade & Lozano 1997, Salaman *et al.* 2002). Populations in Serranía de los Picachos, Caquetá, are indistinguishable in plumage and vocals from those north of the Picachos depression (Appendices 2–3). This population has rather dark or ferruginous underparts and a browner back than those further north and east (Figs. 4–6). Recent studies in the East Andes and an ICN specimen (Andrade & Lozano 1997) confirm that most of the rather dark-breasted 'Bogotá' specimens refer to this taxon. The song and calls are of lower frequency than Central Andes, West Andes and more northern populations (except Yariguíes) (Figs. 10 and 12). A population at the head of the Magdalena Valley and Nudo de Pasto in dptos. Cauca and Huila, and on the east slope of the Andes in dpto. Nariño is geographically continuous with the Central Andes / Ecuador / Peru population but appears to show some 'bleeding' of morphological and vocal features of the East Andes, with on average darker underparts and lower frequency songs in this region.

(iv) SERRANÍA DE LOS YARIGUÍES.—A population recently discovered in this isolated mountain range of the East Andes, in Colombia, is described below.

(v) TAMÁ–SANTANDER.—Records in Colombia and Venezuela in Tamá National Park (Hilty & Brown 1986), with recent specimens from nearby on the west slope of the East Andes at Suratá, dpto. Santander (J. Avendaño-C.). Plumage is similar to that of birds in Serranía de los Yariguíes, but the song is higher frequency (Level 5) than other East Andean populations and is longer and faster on average.

(vi) VENEZUELAN ANDES.—Plumage and voice are similar to the Tamá population, but the song is faster and longer on average. No diagnostic differences in voice or plumage are evident from the Tamá–Santander population. This population is described below.

The absence of *G. nana* in the Perijá range requires further investigation given the many other populations discovered recently, and the lack of field work incorporating mist-netting and sound-recording in that region.

Assignment of existing subspecies names to relevant populations

G. n. nana was described from a 'Colombie' skin by Lafresnaye (1842). The type (MCZ 76739) has a rather brown back, no white breast collar and a dark orange breast. Todd's (1927) notes are also consistent with the type being darker breasted than birds from the Central Andes that he described as *G. n. occidentalis*, apparently through direct comparison. *G. n. nana* thus probably refers to the main East Andes population. The type of *G. n. nana* could conceivably be from the head of the Magdalena valley or West Andes based on its plumage, but the hypothesis that it is an East Andes bird is not rejected.

G. n. occidentalis was purportedly described from the West Andes of Colombia (Todd 1927). However, the type locality is 'Sancudo' (=Zancudo), in the Central Andes (*c.*05°41'N, 75°07'W: Paynter & Traylor 1981). Todd also mentioned three specimens at CM from the West Andes that he did not designate as types, but the only three Colombian *G. nana* presently at CM were collected by Carriker at Sancudo. Todd's description of the plumage of *G. n. occidentalis* is consistent with other Central Andes skins, which are rather pale-breasted compared to East Andes birds. *Contra* almost all literature, *G. n. occidentalis* therefore refers to the Central Andes population.

Krabbe & Schulenberg (2003) held *G. n. occidentalis* to be a synonym of *G. n. nana* on the basis of paler breasted birds in northern Peru similar to *G. n. occidentalis*. Although Central Andes and Ecuador / Peru populations are indistinguishable by voice or plumage, *G. n. nana* refers to the East Andes population. Intermediates appear to be present in Nudo de Pasto, but the Central Andes to Peru population and East Andes population are otherwise separable by plumage, and show Level 1/2 (Ecuador / Peru) and 1/2/3 (Central Andes) differences in acoustic frequency of their songs. Though insufficient to describe a new subspecies under the conservative approach adopted here, *G. n. occidentalis* can be maintained under '75%' subspecies concepts (e.g. Patten & Unitt 2002).

West Andean *G. nana* exhibit small plumage differences from *G. n. occidentalis* but no vocal variables are diagnostic. It was impossible to make adequate comparisons between specimens to determine if any diagnosable plumage differences exist, due to the relative lack of relevant material at any single institution, and the difficulty of importing and exporting biological material from Colombia. For now, the West Andes population is provisionally treated within *G. n. occidentalis*, but requires further investigation given that the West Andean range is isolated, shows considerable climatic differences from the Central Andes and is a centre of avian endemism (e.g. Salaman *et al.* 2003).

It is evident that at least two *G. nana* populations meet the level of all modern subspecies and pattern-defined species concepts: (i) Serranía de los Yariguíes; and (ii) Mérida-Tamá. These are described below.

Grallaricula nana hallsi subsp. nov.

Holotype.—Instituto de Ciencias Naturales, Universidad Nacional, Bogotá, Colombia (ICN 35195). Adult female collected by T. M. Donegan in montane forest just below the treeline at Lepipuerto, upper río Chimera, on the west slope of Serranía de los Yariguíes, Simacota or El Carmen municipality, dpto. Santander, Colombia (06°28′N, 73°28′W) at 2,900 m, on 10 January 2005. DNA sample, field no. 28C, is held at Instituto Alexander von Humboldt's molecular laboratory in Cali. A sound-recording of the holotype in the hand is available at www.xeno-canto.org: XC 21507–508.

Paratypes.—ICN 35193 is an adult female collected by T. M. Donegan on 8 January 2005 at the type locality. ICN 35555 is an adult female collected by T. M. Donegan and J. E. Avendaño-C. at La Aurora, east slope of Serranía de los Yariguíes, Galán municipality, dpto. Santander (06º38′N, 73º24′W) at 2,700 m, on 9 July 2006. An adult was trapped but not collected by J. E. Avendaño-C., at Alto Cantagallos, west slope of Serranía de los Yariguíes, San Vicente de Chucurí municipality, dpto. Santander (06°49′N, 73°22′W) at 2,450 m, in November 2006. Sound-recordings of songs of *G. nana* from the type locality are available at XC 21498–21506.

Diagnosis.—Referred to the genus *Grallaricula* by its diminutive size for a Grallariidae (wing 60–68 mm). Upperparts brownish or olivaceous, the pileum cinereous or rufous; entire underparts ferruginous-red or pale cinereous, the feathers sometimes fringed black; tail about one-third length of wing; and conspicuous rictal bristles (Lowery & O'Neill 1969). Referred to *G. nana* by its slaty crown, rufous underparts, olivaceous back, biometrics (Appendix 2) and generally similar voice consisting of rapidly repeated melancholy hoots that increase and then decrease in acoustic frequency over time.

G. n. hallsi differs (in vocal characters to Levels 1, 4 and 5) from *G. n. nana* of the East Andes by its paler (more orange, less ferruginous) underparts and more olivaceous dorsal plumage; from the northern East Andes population described below in the lower acoustic frequency of its song and call; from *G. n. occidentalis* of the Central Andes by its more olivaceous dorsal plumage and lower acoustic frequency of its song; and from the West Andes population by its more olivaceous dorsal plumage, shorter song length and reduced frequency variation in its song. The new subspecies' song differs in at least three vocal variables from all Venezuelan populations (see Appendix 4), and would merit species rank but for the existence of intermediate populations with fewer diagnosable differences. Other differences between *G. n. hallsi* and *G. nana* populations are presented in Appendix 4.

Description of the holotype.—See Fig. 1. Colours follow Munsell (1977, 2000). Description taken immediately after collection. Lores, central forehead and crown dark grey (Gley 1 3/N). Mantle, upperwing and tail generally brown (2.5Y 3/2), becoming darker and richer brown (less olivaceous: 2.5Y 2.5/1) on folded wing, particularly on primary-coverts and outer webs of flight feathers and rectrices. Large loral spot, eye-ring, breast, throat, flanks, underwing-coverts, tip of largest alula and tip of outermost primary rufous-orange (7.5YR 5/8 or 5YR 5/8, but more rufous). Lower and central belly white. Feathers of underparts dark grey basally with rufous-orange tips (majority, including flanks and breast), white basally with rufous-orange tips and dark shaft (throat) or dark basally with white tips (lower belly). Blackish streaks below eye and in throat area. Rictal bristles black and 5–7 mm long. Irides dark reddish brown (2.5YR 2.5/3). Legs dark grey (Gley 4/N). Bill mostly dark grey (Gley 2.5/N) with pinkish base to lower mandible. Longest primary p6; small emarginations on pp7–9. Narrow yellowish tips to median and lesser coverts. Ovary sac 5 mm × 2 mm. Skull *c*.90% ossified. Stomach contents: coleoptera exoskeleton and other insect remains. Measurements (in mm): wing in life: 78.0, wing-chord (skin) 74.0; tail 33.0; tarsus 32.0; bill to skull 15.0 mm; bill depth at nostrils 4.8 mm; bill width at nostrils 5.2 mm.

Variation in the series.—The paratype from Lepipuerto had a smaller ovary sac (<1 mm) and the skull *c*.70% ossified, and was thus slightly younger, although it had attained adult plumage. It lacked yellowish tips to the median and lesser coverts and had stronger (but still faint) dark throat streaking. The La Aurora bird is similar to other specimens, but had a larger ovary sac, skull *c*.90% ossified and more extensive white on the lower belly. Variation in biometrics and voice of *G. n. hallsi* are detailed in Appendices 2–3.

Vocalisations.—The song of *G. n. hallsi* is generally similar to that of other taxa, being a rapid series of melancholy, high-pitched hoots (Fig. 10h; Appendix 2). The call is similar to that of other populations (except *G. n. pariae* and *G. n. cumanensis*), being a single downstroke or falling whistle (*siu*) (Figs. 12c–d). A distress call, given in the hand, was a harsh 0.3-second screech (concentrated at 2–6 kHz) after a typical downstroke, *siu-chaaaa*, and is perhaps not given frequently in nature.

Distribution.—Apparently endemic to Serranía de los Yariguíes (Fig. 9), where known from three localities, two on the west slope (2,450–2,900 m) and one on the east (2,750 m). At one site, it was recorded immediately below the treeline. Such habitat occurs to 3,200 m on the east slope of Serranía de los Yariguíes (*cf.*, in the west Andes, records up to 3,300 m: Krabbe *et al.* 2006). *G. n. nana* and *G. n. occidentalis* likewise generally occur only in high-elevation humid forest. Records of *G. nana* in Colombia below *c*.2,000 m (e.g. Hilty & Brown 1986) probably reflect either inaccurate locality data or the lower elevations at which some Venezuelan taxa are found. *G. ferrugineipectus / rara*, *G. cucullata* and *G. flavirostris* generally replace *G. nana* below 2,000–2,400 m in appropriate habitat in Colombia.

Habitat and ecology.—Found only in high-elevation montane cloud forest characterised by a broken canopy, many epiphytes, abundant tree ferns, bamboo and other successional plant species. A number of treefalls occurred during field work at study sites where *G. nana* was recorded. The families Moraceae (*Ficus*), Clusiaceae, Poaceae (*Chusquea*) and Actinidaceae (*Saurauia*) are present in this habitat. *G. nana* frequently uses *Chusquea* for nesting (Greeney *et al*. 2008). Rainfall and humidity is considerably higher in Serranía de los Yariguíes than elsewhere in the East Andes (Donegan & Avendaño 2008).

In January at the type locality and in November at Alto Cantagallos, *G. n. nana* was heard singing daily in the two hours after dawn (05.30–07.30 h). It was not heard at La Aurora in July 2005 or April 2006. Singing in November–January might be indicative of the onset of breeding, as many birds nest in the middle Magdalena Valley region in March–April (Cuervo *et al*. 2001). All Yariguíes captures were in mid–late morning and immediately prior to the onset of thunderstorms.

History.—*G. n. hallsi* was initially found and collected during an expedition to the highest elevations of Serranía de los Yariguíes in January 2005. Personnel comprised TMD, B. Huertas J. J. Arias, M. Donegan and J. Pinto. Two females were collected and sound-recordings were made. Details of the expedition and other ornithological results appear in Donegan & Huertas (2005) and Donegan *et al*. (2007). A third specimen was obtained in July 2005 at another high-elevation site in Yariguíes (Huertas & Donegan 2006) and J. E. Avendaño-C. confirmed the presence of *G. n. hallsi* at a third site in Serranía de los Yariguíes in 2006 (Donegan *et al*. 2007). This is the fourth new taxon to be described as a result of our work (Donegan & Huertas 2006, Huertas & Arias 2007, Donegan & Avendaño 2008).

Etymology.—The subspecies epithet honours the late Alan G. Halls of Caversham, UK (d. January 2005, simultaneous with the discovery of *G. n. hallsi*). Alan's surname is formed as a fictional second declension Latin noun *Hallsus* and declined in the genitive singular. Alan became a keen birder in the 1950s and his enthusiasm for birds and tutoring younger people, including myself, never waned. He authored monthly bird articles in his local newspaper, *Caversham Bridge*, for many years. Alan was a modest person and may have baulked at the notion of a bird named in his honour, but this discovery and others owe much to his encouragement. The name *hallsi* is not known to be preoccupied or used for any other Grallariidae.

Discussion.—The reasons for the presence of multiple distinctive subspecies in the East Andes are enigmatic (Donegan *et al*. 2007). *G. n. hallsi* is intriguingly closer to *G. n. nana* in, for instance, acoustic frequency of song, song length and number of notes, but closer to the new taxon described below in, e.g., plumage, song speed and change of pace in the song. The shortest and highest-elevation 'bridge' between Yariguíes and the main East Andes is closer to the range of *G. n. nana*. A not dissimilar pattern occurs in *Scytalopus griseicollis*, with *S. g. gilesi* endemic to Yariguíes and two other subspecies in the main East Andes with a north–south divide. Similar upperparts plumage in Yariguíes and Tamá may reflect convergent evolution, as Gloger's Rule (Zink & Remsen 1986) determines that plumage is darker in more humid regions (or here, more olivaceous and less brown dorsal plumage).

A new subspecies from the Venezuelan Andes

Hellmayr (1917) noted morphological differences between specimens from the Mérida range and 'Bogotá', and presented biometric data for the two populations. However, he provisionally included the Venezuelan population within *G. n. nana* given the lack of reliable locality data for the Bogotá specimens and the paler plumage of one of them. I suspect that the paler bird was of *G. n. occidentalis*, as this taxon is also represented by 'Bogotá' specimens at BMNH and AMNH.

Hellmayr (1917) further commented: 'The two Bogotá specimens are remarkably dark, the third however is quite consistent with the Mérida series, which by the way to some extent varies in the colouring of the underparts and upperparts. Provisionally, I might have combined therefore the Colombian and west Venezuelan regions' birds, particularly since the so-called Bogotá skin delivers no adequate study objects anyhow.' Subsequently, Cory & Hellmayr (1924) noted that 'Birds from the Andes of Mérida agree with one from 'Bogotá', while two other 'Bogotá' skins are conspicuously darker, both above and below. A good series of fresh specimens from the type locality should be compared.' These remarks appear to have been subsequently forgotten, although K. C. Parkes also considered the Mérida population to represent an undescribed subspecies (handwritten notes at AMNH).

Given the availability now of reliable locality, morphological and vocal data for *G. nana* populations in the East Andes, it is possible, at last, to confirm Hellmayr's suspicion that birds from Mérida merit taxonomic recognition. Those on the other side of the Táchira depression, in Tamá National Park and environs, show statistically significant differences in song length, number of notes, song speed and acoustic frequency from Mérida birds. However, none of these differences reaches Level 2 or more. Their plumage is also similar. The Tamá population is therefore, provisionally, treated within the following new subspecies of *G. nana* in the Venezuelan Andes (and northern East Andes).

Grallaricula nana nanitaea subsp. nov.

Holotype.—American Museum of Natural History, New York, USA (AMNH 146661). Adult male collected by Briceño, S. B. Gabaldón and sons at La Culata, near Mérida, Venezuela, at an elevation of 3,000 m, on 24 January 1911. This locality is at *c*.08°45'N, 71°05'W (Paynter 1982).

Paratypes.—All were collected at the same locality as the holotype. AMNH 96305 is an adult male collected by S. B. Gabaldón at 2,000 m on 28 May 1904. AMNH 492317 is an adult male collected by Briceño (no other data). Other specimens pertaining to this taxon but not designated as types are listed in Appendix 2 and come from the range formerly assigned to *G. n. nana* in Venezuela, *per* Hilty (2003) and Restall *et al*. (2006). Specimens from the Tamá region and Suratá, dpto. Santander, are also provisionally assigned to this subspecies, but are not designated as types.

Diagnosis.—Referred to the *G. nana* group by the same rationale as for *G. n. hallsi*. Differs (in vocal characters to Levels 1, 4 and 5) from *G. n. hallsi* in its higher frequency song (and, in the case of the Mérida population alone, also higher frequency call, faster song with greater acoustic frequency variation and greater number of notes). From *G. n. nana*, it can be separated by its more olivaceous back, paler breast and higher acoustic frequency in its song and calls. From *G. n. occidentalis* and the West Andes population it differs in its more olivaceous mantle, and from *G. n. olivascens* in its less olivaceous mantle and slower song. Other differences between *G. n. hallsi* and other *G. nana* populations are presented in Appendix 4.

Description of the holotype.—Lores, central forehead and crown dark grey (Gley 1 3/N). Mantle and tail generally brown (10YR 3/3), becoming richer brown (less olive) over upperwing, particularly on the primary-coverts and outer webs of the flight feathers and rectrices. Large loral spot, eye-ring, throat, breast, flanks, underwing-coverts, tip of largest alula and tip of outermost primary orange-rufous (7.5YR 5/8 or 5YR 5/8 but more rufous). Central belly white. Small and indistinct patch of feathering on upper breast white. Breast feathers dark grey basally with rufous tips (most of flanks and breast), white basally with rufous tips (throat) or dark basally with white tips (white of breast and lower belly). Trailing edge of primaries pale grey distally. Rictal bristles black and 5–7 mm long. The specimen's label states that the irides are blue, as implausibly noted for various other *G. nana* collected by Briceño and Galbadón. This population has a dark brown iris. Measurements (mm): Wing chord 66.0; tail 31.0; tarsus 31.0; bill to skull 16.5; bill width at nostrils 4.0.

Variation in the series.—Biometric and vocal data (including vocal differences between the Tamá and Mérida populations) are presented in Appendices 2–3. Depictions of *G. n. nanitaea* appear in Hilty (2003) and Restall *et al.* (2006), both labelled *G. n. nana*. Fig. 7 shows the AMNH Mérida series. There is notable variation in the extent of the white breast collar. Photographs of live birds suggest that this is invisible in life, but it may be visible in singing males, and appears reduced in female specimens. Juveniles COP 73942 and 14524 both have asymmetrical patches of dark rufous (2.5YR 3/4) feathering on the rear crown and breast, and stronger blackish markings on the throat and chin (Restall *et al.* 2006), but typical upperparts (see Fig. 2). Asymmetric dark rufous patches are also a feature of juvenile *G. n. occidentalis* (e.g. AMNH 184358), the West Andes population (ICN 25921) and *G. n. olivascens* (Phelps & Phelps 1949, Restall *et al.* 2006), but unknown in *G. n. pariae* or *G. n. cumanensis*. COP 62203–04 possess a less extensive pale bill base.

Distribution.—Known from the entire Mérida range of the Andes in Venezuela, at least from north-east Trujillo to Táchira, but replaced in the Coastal Cordillera of Venezuela by *G. n. olivascens* (Fig. 9a). In the East Andes, the potential ranges of *G. n. nanitaea* and *G. n. nana* are separated by a habitat discontinuity associated with the río Chicamocha Valley (Fig. 9b). Other high-elevation birds showing geographical variation in this region (e.g. *Chlorospingus ophthalmicus*, *Atlapetes schistaceus*, *Scytalopus griseicollis*) may have similar subspecies distributions.

Ecology.—Colombian Tamá specimens were collected in high-elevation cloud forest with a dense understorey dominated by *Rhipidocladium* sp. (label data).

Etymology.—The subspecies epithet is a non-variable combination of two Spanish-language words, suggestive of a diminutive version of the subspecies name presently assigned to this population, *nana*. The full name *Grallaricula nana nanitaea* recalls the Spanish advent carol 'A la nanita nana nanita ea'. The name *nanitea* is not known to be preoccupied or used for any other Grallariidae.

Is *G. n. pariae* a valid subspecies?

G. n. cumanensis occurs in the Caripe Mountains (type locality Las Palmales and Rincón San Antonio, Cumaná, *c.*10°17′N, 63°45′W: Paynter 1982) in the eastern mainland of Sucre state, Venezuela (Hartert, 1900, 1922). *G. n. pariae* is considered endemic to the Paria Peninsula, with the type locality at Cerro Azul, Sucre, Venezuela (*c.*10°40′N, 61°56′W: Paynter 1982).

G. n. pariae was described as differing from *G. n. cumanensis* in its darker upperparts and more olivaceous back with a less yellowish tinge (Phelps & Phelps 1949). Such differences may have been apparent on fresh specimens, but no diagnostic plumage differences were noted during this study, thereby calling into question the validity of *G. n. pariae*. Nonetheless, songs were statistically significantly different in maximum acoustic frequency (Level 1), whilst *G. n. cumanensis* has a narrower bill (Levels 1 and 2) and individual trills showed apparent Level 5 differences in song speed, although this is based on a single recording of *G. n. cumanensis*. Trill speed is thought to be constrained by the size and mass of the bill (Podos *et al.* 2004). The faster trill and narrower bill of *G. n. cumanensis* could therefore result from the same adaptation. As *G. n. cumanensis* meets at least some subspecies concepts, synonymy is not proposed.

Species limits

Treatment of *G. nana* as a single species does not accord with any species concept in modern use. All described taxa, except perhaps *G. n. occidentalis* and *G. n. pariae*, are phylogenetic species (*per* Cracraft 1983), whilst *G. n. cumanensis / pariae* and *G. n. kukenamensis* emerge as candidates for species rank under a modern interpretation of the Biological Species Concept (Helbig *et al.* 2002).

In the Andean and Coastal Cordillera subspecies *nana*, *occidentalis*, *hallsi*, *nanitaea* and *olivascens* (hereafter '*nana* group'), inter-population plumage and biometric differences are relatively small. Up to Level 5 differences, in at most a single vocal variable, were observed between geographically adjacent populations. That parapatric or sympatric *Grallaricula* species studied all show diagnosability in three or more vocal characters does not mean that populations with fewer diagnosable vocal differences would fail to interbreed. However, in light of recently reported inter-species hybridisation between two sympatric Grallariidae (Cadena *et al.* 2007), a cautious approach is adopted. It is doubtful whether small or overlapping vocal differences, such as those among adjacent populations in the *nana* group, would pose a barrier to reproduction in the hypothetical event of their being found together. Subspecies rank is therefore a plausible treatment under the Biological Species Concept for the *nana* group.

The modest differences between members of the *nana* group contrasts with the substantial shift in biometric, plumage and vocal characters between allopatric *G. n. olivascens* of the Coastal Cordillera and *G. n. cumanensis* of the Caripe Mountains (Figs. 3, 8, 11 and 12). *G. n. cumanensis* and *G. n. pariae* (hereafter '*cumanensis* group') are diagnosably different from all other *G. nana* populations in their darker and more rufous underparts coloration, more extensively white belly, presence of a more elongated orange loral mark, presence of a white postocular spot; broader based, thicker, less tapering and more extensively pale bill; faster, lower frequency song with more staccato note shape; and strikingly different trilling call. Both members of the *cumanensis* group differ from all populations and subspecies in the *nana* group in at least three variables to their song. Vocal differences between the *cumanensis* and *nana* groups are therefore equivalent to those between sympatric *Grallaricula* species. Moreover, the geographically closest race (*G. n. olivascens*) differs even more radically from the *cumanensis* group than some more distant populations of the *nana* group, exhibiting diagnosable differences in four variables to its song, as well as in tail length, tarsus length, bill width and bill shape (Appendix 4). The combination of vocal, biometric and plumage differences mandate species rank for the *cumanensis* group with respect to the *nana* group.

Drawing species limits in *G. nana* is complicated by the lack of vocal data for morphologically diagnosable *G. n. kukenamensis* of the tepuis. This is geographically the most isolated taxon, being separated by at least 350 km of unsuitable lowland habitat from other populations. By contrast, the *nana* and *cumanensis* groups are separated by 200 km (Fig. 9). *G. n. kukenamensis* occurs in mountains that are considered to predate the Andes and where 'basal' taxa are sometimes revealed in molecular studies (Rheindt *et al.* 2008). It is diagnosable from all members of the *nana* group by its shorter tarsus (Level 5), and from geographically proximate *olivascens* and *nanitaea* in its broader bill and shorter tail. It is closer to the *nana* group than *cumanensis* group in overall plumage, but differs in plumage saturation of both upperparts and underparts (Fig. 4). The described single-note call (Braun *et al.* 2003; Fig. 12m), if confirmed, would be similar in length and acoustic frequency to calls of the *nana* group but could not be confused with *cumanensis* group calls. *G. n. kukenamensis* is not diagnosable from the *cumanensis* group in biometrics, other than bill shape (Fig. 8), but shares all plumage differences from these taxa with the *nana* group (described above). The tentative recording of the song of *G. n. kukenamensis* differs (to Levels 4/5) from that of all other *G. nana* taxa in note shape, song length and number of notes, and compared to the *cumanensis* group, the song differs in note shape, length, number of notes, speed and acoustic frequency. In each case, more than three differences were observed (the benchmark for species rank). Although the statistical tests employed are highly conservative, they are based on a single recording only tentatively identified and make assumptions about variance of vocal variables in the *G. n. kukenamensis* population.

Four possible approaches to species limits must be considered under a modern interpretation of the Biological Species Concept (Helbig *et al.* 2002): (i) split the *cumanensis* group and lump *kukenamensis* within the *nana* group; (ii) split the *cumanensis* group and lump *kukenamensis* within the *cumanensis* group; (iii) treat the *nana* group, *cumanensis* group and *kukenamensis* as three species; and (iv) retain *G. nana* as a single species. The first approach would be supported by differences in plumage and calls, but is inconsistent with biometrics. Lumping *kukenamensis* within the *cumanensis* group would be supported by biometrics (tarsus length and bill width), but inconsistent with plumage, bill morphology and calls. Retention of *G. nana* as a single species is precluded because the *nana* and *cumanensis* groups exhibit vocal differences equivalent to those between sympatric *Grallaricula* species. A three-way split is therefore the better approach under a modern Biological Species Concept. Given that several other phylogenetic species are involved, this split is conservative. However, I recognise that taxonomists who prefer a 'status quo is best' approach (e.g. some contributors to Remsen *et al.* 2008) will probably prefer to wait for definitive vocal data for *G. n. kukenamensis* or a molecular study before changing current treatments.

Ridgely & Tudor (1994) proposed Paria Antpitta as a vernacular name for *G. n. cumanensis*. However, the species-group to which it belongs is not restricted to the Paria Peninsula and would not take the name *pariae*, which is junior to *cumanensis*. I suggest Sucre Antpitta as a more appropriate name for the *cumanensis* group given that it is near endemic to that state, extending only marginally into north Monagas and north-east Anzoátegui. Guianan Antpitta could be used for *G. n. kukenamensis* (Tepui Antpitta is already used for *Myrmothera simplex*). Given that the Andean and Coastal Cordillera species *G. nana* is so widespread, it should retain the English name Slate-crowned Antpitta, even if split.

Conservation

The *cumanensis* group is probably threatened. It is locally common but few modern-day localities are known. The two species endemic to the Paria Peninsula and Caripe Mountains with a similar range to the *cumanensis* group, White-throated Barbtail *Premnoplex tatei* and Venezuelan Flowerpiercer *Diglossa venezuelensis*, are both treated as threatened. Various other endemic birds with smaller distributions within the Caripe-Paria region Endemic Bird Area are also threatened (Stattersfield *et al.* 1998). *G. cumanensis* is probably Endangered, given its similar habitat use and elevational range to *P. tatei*. *G. n. kukenamensis* and the *nana* group should be regarded as Least Concern on the basis of their range sizes compared to species of similar distribution.

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APPENDIX 1: Materials examined

Specimens

G. n. occidentalis ECUADOR: AMNH 184353–55, 184358 (juvenile), 186377 (Sumaco, Napo); MNHN unnumbered (Choconta). WEST ANDES, COLOMBIA: ANSP 142395 (photograph) (Gamboa = San Antonio, Cauca, 02°37′N, 76°54′W, 2,012 m); IAVH 13387, 13410 (Parque Nacional Natural Tatamá, Risaralda, 05°12′N, 76°06′W); ICN 25920–21 (Corea, Farallones de Cali, Valle, 03°22′N, 76°53′W, 2,700 m); LACM 30858–59 (Cerro Munchique, El Tambo, Cauca, 02°32′N, 76°57′W, 2,500 m). *Not examined*: ANSP 142394, 144677 (El Tambo, Cauca, 02°25′N, 76°49′W, 1,829 m); FMNH 249745–46 (Cerro Munchique, as above); Museum of Natural History, Geneva (MHNG) 1128.022 (Cerro Munchique, as previous, 2,000 m); NMNH 446635 (Cerro Munchique, as previous); Peabody Museum of Natural History (PMNH) 54539 (Cerro Munchique, as previous, 2,200 m). *Note*: AMNH 108099 (San Antonio, La Cumbre, Valle del Cauca, 03°30′N, 76°38′W, 1,800 m) is *G. flavirostris*. CENTRAL ANDES, COLOMBIA: AMNH 112010 (above Salento, Quindio, 04°38′N, 75°34′W, 3,000 m), 112011 (Laguneta, Quindio, 04°35′N, 75°30′W, 3,090 m), 492309 ('Bogotá'); ANSP 155176 (photograph) (Laguneta, as above, 2,134 m); BMNH 89.9.10.928 ('Bogotá'), 89.9.10.929 (Medellín, 06°15′N, 75°35′W), 89.9.10.930 (Santa Elena, Medellín, 06°15′N, 75°34′W); CM 70299, 70423, 70434 (holotype; photograph) (El Zancudo, Manizales, Caldas, 05°05′N, 75°30′W); IAVH 13072–73 (Parque Municipal Campoalegre, Risaralda, 04°52′N, 75°31′W, 2,470 m); MNHN 653 ('Antioquia'). *Not examined*: Nationaal Natuurhistorisch Museum, Leiden (RMNH) g.n.0.1 (Medellín, Antioquia, 06°15′N, 75°35′W); National Museum of Natural History, Washington DC (NMNH) 436475–76 (Sonsón, Antioquia, 05°42′N, 75°17′W); Museo de Historia Natural, Universidad del Valle, Calí (MHNUV) 4731 (no locality), 4802–04 (Salento, Quindio, 04°38′N, 75°34′W, 2,140 m), 6165 (Ucumarí, Santa Rosa de Cabal, Risaralda, 04°46′N, 75°37′W, 2,400 m).

G. n. subsp.? HEAD OF MAGDALENA VALLEY, COLOMBIA: ANSP 155852 (photograph) (San Agustín, Huila, 01°50′N, 76°20′W); IAVH 2489 (Quebradón, Moscopán, Cauca, 02°14′N, 76°10′W, 2,285 m). *Not examined*: MHNUC unnumbered (Moscopán, La Plata, Huila/Cauca, 02°20′N, 76°05′W, 2,300 m); FMNH (photograph) 292120–25 (Llorente, Tumaco, Nariño, 00°49′N, 77°15W), 292119 (La Victoria, Ipiales, Nariño, 00°35′N, 77°10′W); MNHG 1179.045 (as previous, 2,800 m).

G. n. nana EAST ANDES, COLOMBIA: BMNH 44.12.31.21, 54.1.25.81 ('New Grenada'), 89.9.20.651–652, 89.9.10.929 ('Bogotá'); ICN 31322 (Capenta, Junín, Cundinamarca, 04°34′N, 73°41′W, 2,600 m); MCZ 76739 (holotype; photograph) ('Colombie'). *Not examined* (presumably this or *G. n. occidentalis*): MCZ 30816 ('Bogotá'). PICACHOS, COLOMBIA: IAVH 10253–55 (Parque Nacional Natural Los Picachos, Finca Andalucia, Caquetá, 02°44′N, 74°53′W, 2,000 m).

G. n. hallsi (for details see text): ICN 35195 (holotype), 35193 (paratype), 35555 (paratype).

G. n. nanitaea MÉRIDA, VENEZUELA: AMNH 96305 (Culata, Mérida, 08°45′N, 71°05′W, 2,000 m), 100209, 492311–13 (Walle [=Valle], 08°70′N, 71°06′W, 2,165 m), 146661 (holotype, Culata, 3,000 m), 492317 (paratype, Culata), 492314–16 (El Escorial, Mérida, 08°38′N, 71°05′W), 492318 (Mérida); COP 4958 (Páramo Misisí, Trujillo, 09°20′N, 70°20′W, 2,100 m), 14524 (Quintero, Mérida, 2,500 m), 19961–62 (Páramo Cendé, Trujillo, 08°40′N, 71°00′W, 2,700 m), 24544–46 (Boca de Monte, Pregonero, Táchira, 08°01′N, 71°46′W, 2,400 m), 65392 (La Azulita, Mérida, 08°43′N, 71°27′W, 2,300 m); MNHN 652 (Mérida). SANTANDER–TAMÁ: VENEZUELA: COP 73941–43 (Cumbres Cerro Retiro, Revancha, Táchira, 07°30′N, 72°23′W, 2,800 m), 74419–20 (Copas La Revancha, Táchira, 07°30′N, 72°23′W, 2,800 m), 62203–06 (Hacienda La Providencia, Río Chiquito, Táchira, 07°19′N, 71°37′W, 2,100–2,300 m). COLOMBIA: IAVH 10702, 10714, 10722 (Parque Nacional Natural Tamá, Herrán, Norte de Santander, 07°26′N, 72°27′W, 2,430 m); ICN 33933 (as IAVH specimens), 36125 (Vereda El Monsalve, Suratá, Santander, 07°23′N, 73°00′W, 3,000 m). *Not examined*: FMNH 43602 (Páramo de Tamá, Norte de Santander, 07°25′N, 72°26′W).

G. n. olivascens COASTAL CORDILLERA, VENEZUELA: AMNH 155733 (no locality), 322978 (Colonia Tovar, 10°25′N, 67°17′W, 1,900 m), 492319 (Galipán, Cerro del Avila, north of Caracas, 10°32′N, 66°53′W, 2,000 m); BMNH 1915.3.16.8–16.9 (Galipán, Caracas, 10°34′N, 66°54′W); COP 1467–68, 3444 (Colonia Tovar, 1,800–1,950 m), 13052, 50090, 56779 (Junquito, Distrito Federal, 10°28′N, 67°05′W, 2,000 m), 58453–54 (locality not noted), 61638–41 (Junquito, Distrito Federal), 62590 (Estación Teleférico, Cerro El Avila, 2,100 m), 62591, 62593–94 (Galipán, 1,900 m), 75776 (Fundo Jeremba, Colonia Tovar).

G. n. cumanensis CARIPE, VENEZUELA: AMNH 188255 (La Latal, Sucre, 10°10′N, 63°55′W, 1,000 m), 492322 (Río San Antonio, Cumaná, 10°27′N, 63°50′W), 492321 (paralectotype, Los Palmales, Cumaná); COP 15537 (Cerro El Pecnío, Bergantín, Anzoátegui, 10°01′N, 64°22′W, 1,300 m), 23057 (Cerro Negro, Caripe, Monagas, 10°12′N, 63°29′W, 1,500 m).

G. n. pariae PARIA, VENEZUELA: AMNH 388107 (paratype) (Cerro Humo, Irapa, Sucre, 10°40′N, 62°30′W, 1,100 m); BMNH 1957.1.2 (paratype, Maino, Cerro Humo, Sucre); COP 40514–22 (paratypes) (La Cumbre, Cerro Azul, Sucre, 10°40′N, 61°56′W, 820–920 m), 41051–56 (paratypes) (Cerro Humo, Irapa, Sucre, 1,000 m), 44012–30 (paratypes) (Cerro Azul, Sucre, 900–920 m), 44240–54 and 44256–58 (paratypes) (Cerro Humo, Sucre, 1,000–1,200 m), 57002–12 (Cerro Humo, Irapa, Sucre, 920 m).

G. n. kukenamensis TEPUIS, GUYANA?: BMNH 89.7.10.926 (holotype) (Mt. Kukenam, 1,500 m). VENEZUELA: AMNH 236691–92 (Mt. Roraima, 05°09′N, 60°47′W, 2,000 m); COP 4240 (Arabupu, Mt. Roraima, 05°06′N, 60°44′W), 24956, 27095–99 (Ptari-tepui, Bolívar, 05°46′N, 61°46′W, 1,300–1,900 m), 27087–94, (Sororopán-tepui, Bolívar, 05°45′N, 61°43′W, 1,400–1,800 m), 35779–81 (Chimantá-tepui, Bolívar, 05°18′N, 62°10′W, 700–1,850 m), 42094–95 (Acopán-tepui, Bolívar, 05°12′N, 62°14′W, 1,800 m), 79001 (km 125 on El Dorado–Santa Elena road, Bolívar, *c.*05°28′N, 61°00′W, 1,350 m).

G. f. ferrugineipectus VENEZUELA: BMNH 1915.3.16.4, 1915.3.16.7 (Galipán, Caracas); COP 18518–19, 18521–23, 18525–26, 71734, 72054, 72056 (details not noted). COLOMBIA: IAVH 10921 (Parque Nacional Natural Tamá, Norte de Santander, 07°06′N 72°14′W, 1,250 m); MLS 3946 (El Diamante, Norte de Santander).

G. f. rara VENEZUELA: BMNH 1952.39.1 (Cerro Pejochaina, Caracas); COP 54875–76, 54880, 54921–25, 57608, 72837 (details not noted). COLOMBIA: MLS 3944–45 (La Victoria, Sasaima, Cundinamarca); MNHN 2001.656 ('Colombia').

G. f. subsp. COLOMBIA: IAVH 11953–54, 11997–98, 12001, 12007 (Río Tapias, Hacienda Tintina, Neira, Caldas, 05°14′N, 75°41′W, 1,080 m).

G. cucullata COLOMBIA: NHM 89.9.10.932, 89.9.20.59 (Santa Elena, Antioquia), 89.9.20.655 ('Bogotá').

Sound-recordings

XC = www.xeno-canto.org catalogue numbers; IAVH = Instituto Alexander von Humboldt sound archive numbers; and Cornell to Cornell Lab of Ornithology archive numbers.

G. n. occidentalis PERU: Cordillera del Cóndor, Cajamarca (04°54′S, 78°54′W, 2,300 m) (T. Mark: XC 7013); Cerro Chinguela, Cajamarca (05°07′S, 79°25′W) (T. A. Parker *in* Isler & Whitney 2002); Montana Negra, Cordillera del Cóndor, Cajamarca (05°04′S, 78°44′W, 2,450 m) (T. Mark: XC 10434); Paja Blanca, Cajamarca (06°24′S, 79°07′W, 2,900 m) (F. A. Pratolongo); Bosque de Protección Pagaibamba (06°26′S, 79°04′W, 3,000 m) (F. A. Pratolongo). ECUADOR: Guacamayos, Napo (00°37′S, 77°50′W, 2,000–2,200 m) (W. Halfwerk: XC 10602–03; R. Ahlman: XC 13225; Krabbe *et al.* 2001, Krabbe & Nilsson 2003); Volcán Corazón, Zamora-Chinchipe (Krabbe *et al.* 2001); Cabañas San Isidro, Napo (00°35′S, 77°53′W, 2,100 m) (N. Athanas: XC 5060; Moore & Lysinger 1997); Arenales, Río Paute, Azuay (02°34′S, 78°34′W, 2,350–2,400 m) (Krabbe & Nilsson 2003); km 5 on Santa Barbara–La Bonita road, Sucumbíos (00°39′N, 77°30′W, 2,700 m) (Krabbe & Nilsson 2003); Tapichalaca Biological Reserve, Zamora-Chinchipe (04°29′S, 79°07′W) (B. Harris). WEST ANDES, COLOMBIA: Páramo Frontino, Antioquia (06°26′N, 76°05′W, 3,100–3,200 m) (N. Krabbe); Pueblo Rico, Risaralda (05°09′N, 76°02′W, 2,620–2,680 m) (S. Córdoba: IAVH 15968, 15972–76). CENTRAL ANDES, COLOMBIA: Río Blanco, Caldas (05°04′N, 75°32′W, 2,400–2,500 m) (D. Calderón: XC 'mysteries' page, 300, 306; B. Davis: XC 13907, 17622; H. van Oosten: XC 18290; M. Álvarez: IAVH 11452, 11479); El Guayabo, Neira, Caldas (05°14′N, 75°03′W, 3,600 m) (Álvarez & Córdoba 2002, Álvarez *et al.* 2007: IAVH 7406, IAVH 7401–08 [treated as same recording], IAVH 7736, 7791, 10055); Alto de San Sebastian–La Castellana, Antioquia (06°03′N, 75°35′W, 2,700 m) (A. M. Cuervo); Finca Los Molinos, Ibague, Tolima (04°26′N, 75°14′W, 2,000–2,200 m) (O. Laverde: XC 12421; IAVH 17268); Reserva Natural Ibanasca, Ibague (04°35′N, 75°14′W, 2,300–2,600 m) (O. Laverde); Parque Municipal Campoalegre, Finca La Granja, Risaralda (04°52′N, 75°31′W, 2,470–2,680 m) (S. Córdoba: IAVH 15266). HEAD OF MAGDALENA VALLEY, COLOMBIA: Reserva Los Yalcones, San Agustín, Huila (01°47′N, 76°21′W, 2,420–2,600 m) (D. Calderón: IAVH 16521, 16523, 16552).

G. n. nana EAST ANDES, COLOMBIA: Rogitama, Arcabuco, Boyacá (05°47′N, 73°31′W; 2,500 m) (J. Zuluaga); Cañon del Río Pómeca, Arcabuco, Boyacá (05°48′N, 73°28′W, 2,600 m) (Álvarez 2000: IAVH 10442; also IAVH 10437, 10439–40); Finca San Cayetano, Bojacá, Cundinamarca (04°37′N, 74°18′W, 2,650 m) (O. Laverde); Reserva Forestal Río Blanco, La Calera, Cundinamarca (04°42′N, 73°51′W, 3,000 m) (F. G. Stiles: IAVH 10848). PICACHOS: Parque Nacional Natural Pichachos–Río Pato, San Vicente del Caguán, Caquetá (02°48′N, 74°51′W, 1,300–2,000 m) (M. Álvarez: IAVH 345).

G. n. hallsi: Serranía de los Yariguíes (details above) (T. M. Donegan).

G. n. nanitaea MÉRIDA, VENEZUELA: La Carbonera, Mérida (08°38′N, 71°22′W, 2,300 m) (P. Schwarz: Cornell 62191); Páramo Zumbador, Táchira (08°00′N, 72°05′W, 2,450–2,800 m) (P. Schwarz: Cornell 62189–90, 62192–93); Parque Nacional Sierra Nevada, Mérida (08°37′N, 17°02′W, 2,400 m) (N. Athanas: XC 6858; A. Spencer: XC 9895; B. M. Whitney); Universidad de Los Andes, Mérida (K. J. Zimmer); La Azulita, Mérida (08°43′N, 71°27′W) (R. Behrstock); El Morro–Aricagua road, Mérida (08°17′N, 71°09′W) (Boesman 2007); Parque Nacional Guaramacal, Trujillo (09°10′N, 70°11′W, 1,600–3,000 m) (Boesman 2007). SANTANDER–TAMÁ, COLOMBIA: Sisavita, Cucutilla, Norte de Santander (07°28′N, 72°51′W, 2,400 m) (S. Córdoba: IAVH 8660, 8662, 8813); Parque Nacional Tamá, Herrán, Norte de Santander (07°26′N, 72°27′W, 2,430 m) (M. Álvarez *in* Córdoba & Álvarez 2003, Álvarez *et al.* 2007: IAVH 11722, 11727).

G. n. olivascens COASTAL CORDILLERA, VENEZUELA: Colonia Tovar, Aragua (10°25′N, 67°17′W, 1,800–2,200 m) (P. Schwarz: Cornell 62187–88; Boesman 1999; B. M. Whitney; M. Isler; P. Coopmans).

G. n. cumanensis CARIPE, VENEZUELA: Cerro Negro, Monagas (10°14′N, 63°34′W, 1,200–1,700 m) (Boesman 2007); Piedra de Moler, Sucre (10°06′N, 63°49′W, 1,840 m) (C. A. Marantz).

G. n. pariae PARIA, VENEZUELA: Paria Peninsula, Sucre (10°41′N, 62°37′W, 600–1,000 m) (Boesman 1999); Cerro Humo, Sucre (10°40′N, 62°30′W, 700 m) (R. Innes; J. I. Areta), as previous (10°42′N, 62°37′W, 950 m) (N. Athanas: XC 3533).

G. n. kukenamensis TEPUIS, VENEZUELA: (80% certain, as bird unseen) Upper Escalera, Bolívar (05°58′N, 61°24′W) (P. Boesman).

G. lineifrons ECUADOR: (all Krabbe & Nilsson 2003, unless stated): Cerro Mongus, Carchí (00°27′N, 77°52′W, 3,300 m); 3–5 km below Oyacachi, Napo (00°13′S, 78°02′W, 3,300 m); Acanamá, Loja (03°41′S, 79°15′W, 3,100 m); Páramos de Matanga, Morona-Santiago (03°18′S, 78°53′W, 3,000–3,250 m); Saraguro, Loja (03°36′S, 79°13′W) (A. Spencer: XC 17214–15).

G. f. ferrugineipectus VENEZUELA: Serranía de San Luis, Falcón (11°12′N, 69°42′W, 1,000–1,600 m) (Boesman 1999); Turgua, Aragua (10°25′N, 66°48′W, 800–1,100 m) (Boesman 1999); San Isidro, Barinas (08°50′N, 70°35′W, 1,500 m) (N. Athanas: XC 6857); Caracas, Aragua (P. Schwarz *in* Isler & Whitney 2002).

G. cucullata COLOMBIA: La Esmeralda–Río Yurayaco, San José del Fragua, Caquetá (01°21′N, 76° 06′W) (M. Álvarez: IAVH 4260, 4355–56).

Photographs

G. n. occidentalis ECUADOR: Cordillera Sabanilla, Zamora-Chinchipe (03°58′S, 79°03′W) (Krabbe & Schulenberg 2003). WEST ANDES, COLOMBIA: Reserva Natural de Aves (RNA) Mirabilis-Swarovski, Cauca (02°31′N, 76°59′W, 2,200 m) (A. Quevedo). RNA Loro Orejiamarillo, Jardín, Antioquia (05°35′N, 75°44′W, 2,400–2,850 m) (J. A. Tobias & A. Quevedo). CENTRAL ANDES, COLOMBIA: RNA Loro Coroniazul y El Mirador, Genova, Quindio (04°08′N, 75°44′W, 3,200 m) (A. Quevedo).

G. n. nanitaea MÉRIDA, VENEZUELA: Parque Nacional Guaramacal, Trujillo (09°10′N, 70°11′W) (K. Perez / J. Léon; Krabbe & Schulenberg 2003). SANTANDER–TAMÁ, COLOMBIA: El Monsalve, Suratá, Santander (07°23′N, 73°00′W, 3,000 m) (J. E. Avendaño: Fig. 2).

G. n. pariae PARIA, VENEZUELA: Cerro Humo, details above (J. A. Tobias: Fig. 3).

Biometrics

G. n. occidentalis WEST ANDES, COLOMBIA: RNA Mirabilis-Swarovski (details above) (J. P. López *et al.* / ProAves); RNA Loro Orejiamarillo (details above) (G. A. Suárez *et al.* / ProAves); RNA Colibrí de Sol, Páramo Frontino, Antioquia (06°26′N, 76°05′W, 3,400 m) (D. Carantón / ProAves). CENTRAL ANDES, COLOMBIA: Reservas de Aves Comunitarias, Roncesvalles, Tolima (04°00′N, 75°40′W) (A. Bermúdez / ProAves). RNA Loro Coroniazul y El Mirador (details above) (D. Y. Ramírez & D. Osorno / ProAves).

G. cucullata COLOMBIA: Nabú, Serranía de los Churumbelos, Cauca (01°36′N, 76°16′W, 1,900 m) (T. M. Donegan, P. G. W. Salaman & A. M. Cuervo).

Other records

G. n. occidentalis ECUADOR: Cajanuma, Parque Nacional Podocarpus (04°16′S, 79°00′W) (Ridgely & Greenfield 2001); Reserva Ecológica Cayambe-Coca, Napo (77°50′W, 00°01′S) (Krabbe & Schulenberg 2003); Parque Nacional Sumaco-Napo Galeras, Napo (00°23′S, 77°45′W) (Krabbe & Schulenberg 2003); Corredor Ecológico Llanganates-Sangay, Tungurahua (01°26′S, 78°10′ W) (Krabbe & Schulenberg 2003); Tapichalaca Biological Reserve (details above) (Greeney & Sornoza 2005). WEST ANDES, COLOMBIA: La Linda, Jardín, Antioquia (05°38′N, 75°48′W, 2,400–2,700 m) (Cuervo *et al.* 2003), Páramo Frontino, Antioquia (06°27′N, 76°05′W, 3,300 m; 06°26′N, 76°05′W, 3,150 m) (Krabbe *et al.* 2007). CENTRAL ANDES, COLOMBIA: Cuenca del Río Toche (04°36′N, 75°24′W) (IAVH). HEAD OF MAGDALENA VALLEY, COLOMBIA: Parque Nacional Natural Cueva de los Guácharos, Huila (01°36′N, 76°08′W) (IAVH); Serranía de las Minas, Boyacá (02°10′N, 76°11′W) (IAVH).

G. n. nana EAST ANDES, COLOMBIA: Bosques de la Falla del Tequendama, Cundinamarca (04°43′N, 74°22′W) (IAVH); Vereda Las Minas, Huila (06°04′N, 73°00′W) (IAVH).

G. n. kukenamensis TEPUI: VENEZUELA: Ptari-tepui, Cerro Cuquenán, Roraima (04°45′N, 61°30′W) (Hilty 2003). GUYANA: Mt. Roraima (05°16′N, 60°44′W, 1,300 m) (Braun *et al.* 2003).

G. n. nanitaea MÉRIDA, VENEZUELA: Cuevas de Carache, Trujillo (09°38′N, 70°14′W) (Hilty 2003).

Note: an extralimital sight record of *G. n. olivascens* at Cerro Tucusito, Miranda / Anzoátegui, Venezuela (10°00′N, 65°39′W, 550 m) (C. Parrish *in litt.* 2008; Hilty 2003) is not included pending confirmation, as confusion with *G. ferrugineipectus*, which is known from specimens taken nearby, is possible.

APPENDIX 2: Biometrics of *Grallaricula nana* and *G. ferrugineipectus* taxa

Data are presented as follows: mean ± standard deviation (*n* = number of specimens or individuals).

Taxon	**Wing-chord from skins (mm)**	**Tail (mm)**	**Tarsus (mm)**	**Culmen (mm)**	**Bill-width (mm)**	**Body mass (g)**
G. n. occidentalis? West Andes, Colombia	68.9 ± 1.7 (66.0–72.0) (*n*=37)	34.3 ± 3.0 (28.0–38.8) (*n*=30)	30.8 ± 1.2 (27.5–33.4) (*n*=30)	16.8 ± 1.7 (13.8–18.8) (*n*=29)	4.5 ± 0.2 (4.2–4.6) (*n*=4)	20.2 ± 0.9 (18.5–22.0) (*n*=34)
G. n. occidentalis Central Andes, Colombia	68.0 ± 2.3 (63.5–71.0) (*n*=15)	33.8 ± 3.0 (30.0–38.0) (*n*=10)	29.8 ± 1.1 (27.9–31.4) (*n*=12)	16.0 ± 0.5 (14.9–16.8) (*n*=11)	4.4 ± 0.4 (4.0–5.0) (*n*=8)	20.7 ± 0.8 (19.9–22.0) (*n*=6)
G. n. occidentalis Ecuador	68.8 ± 2.3 (66.0–71.0) (*n*=5)	33.2 ± 0.8 (32.0–34.0) (*n*=5)	29.4 ± 0.5 (29.0–30.0) (*n*=5)	16.0 ± 0.6 (15.5–16.5) (*n*=4)	4.0 ± 0.1 (3.9–4.0) (*n*=4)	—
G. n. subsp.? head of Magdalena Valley, Colombia	63.8 ± 0.4 (63.5–64.0) (*n*=2)	31.7 ± 2.3 (30.0–33.3) (*n*=2)	29.8 ± 1.1 (29.0–30.5) (*n*=2)	16.0 ± 0.0 (16.0–16.0) (*n*=2)	4.6 ± 0.0 (4.6–4.6) (*n*=2)	20.0 (*n*=1)
G. n. nana Picachos, Colombia	62.7 ± 1.5 (61.0–64.0) (*n*=3)	32.5 ± 0.7 (32.0–33.0) (*n*=2)	30.3 ± 0.3 (30.0–30.5) (*n*=3)	15.7 ± 0.3 (15.5–16.0) (*n*=3)	—	—
G. n. nana East Andes, Colombia	68.7 ± 1.2 (68.0–71.0) (*n*=6)	31.3 ± 1.2 (30.0–32.0) (*n*=3)	29.8 ± 1.1 (28.0–31.0) (*n*=5)	15.9 ± 0.2 (15.5–16.0) (*n*=5)	4.4 ± 0.4 (3.9–5.0) (*n*=6)	—
G. n. hallsi Yariguíes, Colombia	70.0 ± 2.6 (68.0–73.0) (*n*=3)	32.3 ± 0.6 (32.0–33.0) (*n*=3)	31.0 ± 0.9 (30.5–32.0) (*n*=3)	15.8 ± 0.8 (15.0–16.5) (*n*=3)	5.0 ± 0.2 (4.9–5.2) (*n*=3)	20.4 ± 2.4 (18.4–23.0) (*n*=3)
G. n. nanitaea Tamá (Colombia–Venezuela)	66.9 ± 3.2 (61.0–73.0) (*n*=11)	33.5 ± 0.9 (32.0–35.0) (*n*=10)	29.2 ± 0.9 (27.5–30.5) (*n*=10)	15.7 ± 0.8 (15.0–17.0) (*n*=9)	4.8 ± 0.5 (4.2–5.1) (*n*=3)	19.4 ± 2.1 (18.0–23.0) (*n*=5)
G. n. nanitaea Mérida, Venezuela	67.4 ± 2.3 (63.0–73.0) (*n*=20)	32.8 ± 1.8 (29.5–35.5) (*n*=18)	30.2 ± 1.1 (27.5–32.0) (*n*=20)	16.3 ± 1.0 (14.0–18.5) (*n*=20)	4.0 ± 0.1 (3.9–4.2) (*n*=10)	—
G. n. olivascens Coastal Cordillera, Venezuela	65.3 ± 2.4 (61.0–70.0) (*n*=22)	34.0 ± 1.4 (31.5–37.0) (*n*=20)	29.9 ± 1.1 (28.0–32.0) (*n*=21)	16.0 ± 0.9 (14.5–17.5) (*n*=20)	3.6 ± 0.1 (3.5–3.7) (*n*=5)	—
G. n. cumanensis Caripe, Venezuela	63.0 ± 2.3 (60.0–65.0) (*n*=6)	26.9 ± 1.3 (25.0–28.5) (*n*=6)	25.4 ± 1.4 (23.0–26.5) (*n*=5)	16.4 ± 0.8 (15.5–17.0) (*n*=4)	5.4 ± 0.2 (5.3–5.7) (*n*=4)	—
G. n. pariae Paria, Venezuela	63.1 ± 2.0 (60.0–67.0) (*n*=26)	27.6 ± 0.9 (26.0–29.5) (*n*=25)	24.6 ± 1.0 (22.5–26.5) (*n*=25)	17.2 ± 0.6 (16.0–18.5) (*n*=25)	6.0 ± 0.2 (5.6–6.3) (*n*=23)	—
G. n. kukenamensis tepuis, Venezuela–Guyana	64.5 ± 2.0 (60.0–68.0) (*n*=21)	28.5 ± 1.7 (25.0–31.5) (*n*=21)	23.7 ± 0.7 (23.0–25.0) (*n*=21)	16.2 ± 0.4 (15.5–17.0) (*n*=19)	5.2 ± 0.3 (4.8–5.5) (*n*=17)	—
G. f. ferrugineipectus Venezuela	63.9 ± 1.6 (61.0–67.0) (*n*=14)	30.7 ± 1.6 (29.0–34.0) (*n*=13)	22.5 ± 0.9 (21.0–23.0) (*n*=14)	15.8 ± 0.5 (15.0–16.5) (*n*=13)	5.3 ± 0.4 (5.0–5.6) (*n*=2)	15.0 (*n*=1)
G. f. rara Colombia / Venezuela	63.0 ± 1.7 (60.0–66.0) (*n*=13)	30.6 ± 1.3 (29.0–33.0) (*n*=14)	23.0 ± 0.9 (21.0–24.0) (*n*=14)	16.0 ± 0.7 (15.0–17.0) (*n*=13)	5.0 (*n*=1)	—
G. f. subsp. Colombia	67.5 ± 0.8 (66.0–68.0) (*n*=6)	31.0 ± 1.7 (29.0–33.0) (*n*=6)	22.8 ± 0.6 (22.0–23.0) (*n*=7)	16.4 ± 0.4 (16.0–17.0) (*n*=5)	—	17.2 ± 0.8 (16.0–18.0) (d.f.=4)
G. cucullata Colombia	69.8 ± 2.0 (68.0–72.0) (*n*=5)	28.6 ± 2.2 (29.0–31.0) (*n*=5)	24.1 ± 0.9 (23.0–25.2) (*n*=5)	14.1 ± 1.1 (13.0–15.5) (*n*=5)	5.1 ± 0.1 (5.0–5.2) (*n*=3)	18.4 ± 0.2 (18.2–18.5) (*n*=2)

APPENDIX 3: Vocal data for *Grallaricula nana* taxa

Songs

For each taxon / song, data are presented as follows: mean ± standard deviation (*n* = number of songs analysed).

Taxon	No. of notes	Song duration (s)	Song speed (notes/s)	Max. frequency of highest note (kHz)	Frequency variation (kHz)	Change of speed	Position of peak	Note shape
G. n. occidentalis? West Andes, Colombia	20.54 ± 2.54 (15–23) (*n*=13)	2.21 ± 0.28 (1.55–2.52) (*n*=13)	9.32 ± 0.88 (8.49–10.95) (*n*=13)	3.62 ± 0.15 (3.45–3.99) (*n*=13)	0.71 ± 0.14 (0.51–0.97) (*n*=13)	2.38 ± 0.50 (1.83–3.50) (*n*=11)	0.21 ± 0.04 (0.18–0.31) (*n*=13)	'Blobs': down and up
G. n. occidentalis Central Andes, Colombia	16.94 ± 3.14 (10–26) (*n*=35)	1.76 ± 0.25 (1.15–2.60) (*n*=43)	9.50 ± 0.78 (8.13–10.81) (*n*=35)	3.53 ± 0.10 (3.30–3.78) (*n*=43)	0.51 ± 0.13 (0.25–0.91) (*n*=43)	1.69 ± 0.38 (1.19–2.88) (*n*=34)	0.23 ± 0.07 (0.02–0.36) (*n*=36)	'Blobs': upward, flat, u and n
G. n. occidentalis Ecuador & Peru	16.77 ± 1.97 (13–22) (*n*=48)	1.73 ± 0.20 (1.35–2.20) (*n*=51)	9.64 ± 0.82 (7.91–11.31) (*n*=48)	3.65 ± 0.18 (3.37–3.94) (*n*=51)	0.57 ± 0.18 (0.31–1.10) (*n*=51)	1.63 ± 0.27 (1.06–2.18) (*n*=46)	0.21 ± 0.05 (0.11–0.35) (*n*=50)	'Blobs': up, flat, n and u (a Peru recording: upstrokes)
G. n. subsp.? head of Magdalena Valley, Colombia	14.67 ± 1.12 (13–16) (*n*=9)	1.69 ± 0.14 (1.52–1.87) (*n*=9)	8.68 ± 0.45 (8.34–9.87) (*n*=9)	3.40 ± 0.05 (3.31–3.48) (*n*=9)	0.53 ± 0.09 (0.37–0.63) (*n*=9)	1.61 ± 0.13 (1.45–1.78) (*n*=9)	0.27 ± 0.04 (0.19–0.32) (*n*=9)	'Blobs': down, flat and n
G. n. nana Picachos, Colombia	19.67 ± 0.58 (19–20) (*n*=3)	1.99 ± 0.06 (1.95–2.06) (*n*=3)	9.88 ± 0.27 (9.72–10.20) (*n*=3)	3.30 ± 0.01 (3.29–3.30) (*n*=3)	0.51 ± 0.09 (0.44–0.61) (*n*=3)	1.62 ± 0.42 (1.33–2.10 (*n*=3)	0.25 ± 0.04 (0.21–0.30) (*n*=3)	'Blobs': flat and up
G. n. nana East Andes, Colombia	16.84 ± 3.75 (11–22) (*n*=19)	1.73 ± 0.31 (1.33–2.20) (*n*=21)	9.46 ± 0.61 (8.21–10.18) (*n*=19)	3.21 ± 0.09 (3.02–3.38) (*n*=21)	0.47 ± 0.11 (0.26–0.63) (*n*=21)	1.57 ± 0.27 (1.19–2.10) (*n*=15)	0.25 ± 0.05 (0.18–0.35) (*n*=21)	'Blobs': up, down, flat and u
G. n. hallsi Yariguíes, Colombia	13.53 ± 1.19 (12–16) (*n*=15)	1.32 ± 0.11 (1.15–1.59) (*n*=15)	10.26 ± 0.71 (9.23–11.76) (*n*=15)	3.27 ± 0.02 (3.23–3.31) (*n*=15)	0.22 ± 0.05 (0.13–0.33) (*n*=15)	1.31 ± 0.16 (1.12–1.59) (*n*=12)	0.17 ± 0.05 (0.10–0.23) (*n*=15)	'Blobs': up and flat
G. n. nanitaea Tamá (Colombia–Venezuela)	19.85 ± 2.34 (13–23) (*n*=13)	1.81 ± 0.28 (1.27–2.15) (*n*=17)	10.40 ± 0.75 (9.05–11.29) (*n*=13)	3.73 ± 0.08 (3.56–3.85) (*n*=18)	0.45 ± 0.12 (0.23–0.62) (*n*=18)	1.88 ± 0.62 (0.99–2.78) (*n*=9)	0.20 ± 0.05 (0.14–0.29) (*n*=15)	'Blobs': flat, up and down
G. n. nanitaea Mérida, Venezuela	25.88 ± 4.16 (17–32) (*n*=25)	2.21 ± 0.32 (1.40–2.80) (*n*=25)	11.71 ± 0.86 (10.43–13.18) (*n*=25)	3.84 ± 0.20 (3.35–4.17) (*n*=25)	0.72 ± 0.14 (0.33–0.97) (*n*=25)	1.16 ± 0.33 (0.68–2.29) (*n*=24)	0.18 ± 0.03 (0.13–0.26) (*n*=25)	'Blobs': up, down (some long 'tails'), n and flat
G. n. olivascens Coastal Cordillera, Venezuela	31.75 ± 5.57 (17–41) (*n*=20)	2.17 ± 0.40 (1.22–2.75) (*n*=23)	14.66 ± 0.87 (13.21–16.50) (*n*=20)	3.74 ± 0.18 (3.34–3.96) (*n*=24)	0.74 ± 0.22 (0.38–1.24) (*n*=23)	1.36 ± 0.29 (1.06–2.05) (*n*=19)	0.17 ± 0.04 (0.10–0.22) (*n*=23)	'Blobs': up, down, flat and u (some 'tails')
G. n. cumanensis Caripe, Venezuela	33.73 ± 4.77 (25–38) (*n*=11)	1.90 ± 0.27 (1.49–2.15) (*n*=13)	17.78 ± 0.56 (16.82–18.78) (*n*=11)	2.84 ± 0.09 (2.69–2.98) (*n*=13)	0.32 ± 0.10 (0.18–0.45) (*n*=13)	1.08 ± 0.05 (1.00–1.15) (*n*=12)	0.34 ± 0.04 (0.29–0.42) (*n*=13)	'Blobs': down with long 'tails'
G. n. pariae Paria, Venezuela	32.83 ± 1.59 (29–35) (*n*=12)	1.85 ± 0.10 (1.60–2.00) (*n*=12)	17.73 ± 0.31 (17.30–18.33) (*n*=12)	2.71 ± 0.05 (2.63–2.76) (*n*=12)	0.33 ± 0.09 (0.18–0.44) (*n*=12)	1.11 ± 0.06 (1.02–1.20) (*n*=12)	0.36 ± 0.04 (0.27–0.41) (*n*=12)	'Blobs': down with long 'tails'
G .n. kukenamensis tepuis, Venezuela	69 (*n*=1)	5.07 (*n*=1)	13.61 (*n*=1)	3.55 (*n*=1)	0.80 (*n*=1)	0.96 (*n*=1)	0.18 (*n*=1)	Chevron
G. f. ferrugineipectus Mérida, Venezuela	17.10 ± 2.51 (12–20) (*n*=11)	2.10 ± 0.27 (1.50–2.41) (*n*=11)	8.13 ± 0.76 (6.92–9.71) (*n*=11)	2.63 ± 0.13 (2.36–2.77) (*n*=11)	0.48 ± 0.30 (0.21–0.97) (*n*=11)	0.98 ± 0.19 (0.78–1.35) (*n*=11)	0.69 ± 0.07 (0.51–0.80) (*n*=11)	'Blobs': up and down
G. lineifrons Ecuador & Peru	16.43 ± 2.31 (10–20) (*n*=30)	2.92 ± 0.41 (1.69–3.45) (*n*=30)	5.64 ± 0.24 (5.14–6.09) (*n*=30)	4.73 ± 0.19 (4.42–5.21) (*n*=30)	1.30 ± 0.22 (0.86–1.72) (*n*=30)	0.96 ± 0.10 (0.72–1.14) (*n*=30)	0.88 ± 0.09 (0.69–1.00) (*n*=30)	Chevron
G. cucullata Colombia	25.11 ± 4.34 (16–32) (*n*=9)	1.84 ± 0.30 (1.23–2.40) (*n*=11)	14.0 ± 0.70 (13.00–14.81) (*n*=9)	4.40 ± 0.07 (4.29–4.55) (*n*=11)	0.64 ± 0.09 (0.55–0.88) (*n*=11)	1.11 ± 0.19 (0.77–1.48) (n=9)	0.39 ± 0.11 (0.28–0.57) (*n*=11)	Chevron

Calls

For each taxon / call, data are presented as follows: mean ± standard deviation (*n* = number of calls analysed). No recordings were available for the West Andes or head of the Magdalena Valley populations.

Taxon	No. of notes	Call duration (s)	Call speed (notes/s)	Max. frequency of highest note (kHz)	Frequency variation (kHz)	Change of speed	Position of peak	Note shape
G. n. occidentalis Central Andes, Colombia	1 (all) (*n*=12)	0.15 ± 0.02 (0.12–0.18) (*n*=12)	n/a	4.08 ± 0.31 (3.56–4.50) (*n*=12)	n/a	n/a	n/a	Downstroke, some broken; flat notes
G. n. occidentalis Ecuador & Peru	1 (all) (*n*=11)	0.10 ± 0.01 (0.08–0.12) (*n*=11)	n/a	4.30 ± 0.26 (3.90–4.66) (*n*=11)	n/a	n/a	n/a	Downstrokes
G. n. nana Picachos, Colombia	1 (all) (*n*=3)	0.11 ± 0.00 (0.11–0.11) (*n*=3)	n/a	3.71 ± 0.09 (3.62–3.80) (*n*=3)	n/a	n/a	n/a	Flat notes
G. n. nana East Andes, Colombia	1 (all) (*n*=3)	0.11 ± 0.01 (0.11–0.13) (*n*=3)	n/a	3.85 ± 0.01 (3.85–3.86) (*n*=3)	n/a	n/a	n/a	Flat notes
G. n. hallsi Yariguíes, Colombia	1 (all) (*n*=7)	0.12 ± 0.01 (0.12–0.14) (*n*=7)	n/a	4.23 ± 0.22 (3.85–4.49) (*n*=7)	n/a	n/a	n/a	Downstroke, some broken
G. n. nanitaea Tamá (Colombia–Venezuela)	1 (all) (*n*=3)	0.13 ± 0.00 (0.13–0.13) (*n*=3)	n/a	4.73 ± 0.11 (4.60–4.80) (*n*=3)	n/a	n/a	n/a	Sharp note
G. n. nanitaea Mérida, Venezuela	1 (all) (*n*=3)	0.11 ± 0.01 (0.10–0.12) (*n*=3)	n/a	4.81 ± 0.02 (4.79–4.82) (*n*=3)	n/a	n/a	n/a	Downstroke
G. n. olivascens Coastal Cordillera, Venezuela	1 (all) (*n*=14)	0.14 ± 0.02 (0.10–0.17) (*n*=14)	n/a	4.71 ± 0.19 (4.48–5.14) (*n*=14)	n/a	n/a	n/a	Downstroke, some broken
G. n. cumanensis Caripe, Venezuela	*Trills*: 5.40 ± 0.55 (5–6) (*n*=5) *Notes within a single trill*: 6.60 ± 2.59 (3–11) *All notes in series of trills:* 33.00 ± 4.36 (28–36)	*Total*: 0.86 ± 0.07 (0.79–0.95) (*n*=5) *For individual trills*: 0.12 ± 0.15 (0.05–0.21)	*Trills per second*: 6.27 ± 0.20 (6.00–6.55) (*n*=5) *Within trills:* 58.40 ± 3.97 (53.40–65.21)	3.45 ± 0.07 (3.35–3.53) (*n*=5)	0.26 ± 0.23 (0.05–0.65) (*n*=5)	1.60 ± 0.15 (1.39–1.81) (*n*=5)	0.87 ± 0.18 (0.60–1.00) (*n*=5)	Series of short, fast trills
G. n. pariae Paria, Venezuela	*Trills*: 4.24 ± 2.05 (2–8) (*n*=17) *Notes within a single trill*: 5.25 ± 2.83 (2–11) *All notes in series of trills:* 19.29 ± 7.19 (13–34)	*For series of trills*: 0.73 ± 0.27 (0.39–1.22) (*n*=17) *For individual trills*: 0.13 ± 0.07 (0.05–0.29)	*Trills per second*: 5.54 ± 0.80 (4.26–6.57) (*n*=17) *Within trills:* 41.01 ± 3.55 (34.48–49.55)	3.60 ± 0.12 (3.34–3.76) (*n*=17)	0.32 ± 0.11 (0.03–0.46) (*n*=17)	1.65 ± 0.47 (0.79–2.40) (*n*=17)	0.20 ± 0.21 (0.00–0.84) (*n*=17)	Series of short, fast trills
G .n. kukenamensis tepuis, Venezuela	1 (or very fast 3-note trill?) (*n*=3)	0.08 (*n*=1)	n/a	3.48 (*n*=1)	n/a	n/a	n/a	Broken downstroke / of three rapid notes

APPENDIX 4: Differences between *G. nana* taxa

Differences between *G. nana* taxa are shown using diagnosability levels described under Methods. For vocal variables, the following codes are used: NN: number of notes; SL: song length; SS: song speed; MF: maximum acoustic frequency; FV: acoustic frequency variation; CP: change of pace; PP: position of peak in acoustic frequency; NS: note shape. Degrees of freedom can be calculated by taking the lower value of the two taxa for the relevant variable under '(*n*=x)' in Appendix 2 or 3, and subtracting 1. For biometrics, the following codes are used: WI: wing-length; TL: tail-length; TR: tarsus-length; BL: bill-length; BW: bill-width; MS: mass; BS: bill shape. The taxon with the higher or lower of the relevant variable may be seen in Appendices 1 and 2. Differences in bold denote that the two taxa are phylogenetic species based on the relevant variable. The layers of shading represent possible new species limits discussed herein.

	***G. n. occidentalis?* (West Andes)**	***G. n. occidentalis* (Central Andes)**	***G. n. occidentalis* (Ecuador)**	***G. n. nana* (East Andes)**	***G. n. hallsi* (Yariguíes)**	***G. n. nanitaea* (Tamá–Santander)**	***G. n. nanitaea* (Mérida)**	***G. n. olivascens* (Coastal Cordillera)**	***G. n. cumanensis* (Caripe)**	***G. n. pariae* (Paria)**	***G. kukenamsis* (tepuis)**
***G. n. occidentalis?* (West Andes)**											
Song	X	SL(1) NN(1) FV(1) CP(1)	SL(1) NN(1) FV(1) CP(1)	NN(1) SL (1) MF(1,2,4) FV(1) CP(1)	NN(1,2) **SL (1,2,3,5)** SS(1) MF(1,2,4) **FV(1,2,3,4,5)** CP(1,2,4)	SL(1) SS(1) FV(1)	NN(1) SS(1,2) MF(1) CP(1,2)	NN(1,2) **SS(1,2,3,4,5)** CP(1,2) PP(1)	SL (1) NN(1,2,4) **SS(1,2,3,4,5) MF(1,2,3,4,5)** FV(1,2,4) CP(1,2,4) PP(1,2,3) **NS(4)**	SL (1) **NN(1,2,3,4,5) SS(1,2,3,4,5) MF(1,2,3,4,5)** FV(1,2,4) CP(1,2,4) PP (2,3) **NS(4)**	**NN(2,4,5) SL(2,4,5) NS(4)** SS(2)
Call	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
***G. n. occidentalis* (Central Andes)**											
Plumage ¦X¦ *Song*	?	X	MF(1)	MF(1,2,3)	SL (1,2) NN(1) SS(1) **MF(1,2,5)** FV(1,2) CP(1) PP(1)	MF(1,2) NN(1) SS(1)	SL (1) NN(1,2) SS(1,2) MF(1,2) FV(1) CP(1) PP(1)	SL (1) NN(1,2) **SS(1,2,3,4,5)** MF(1) FV(1) CP(1) PP(1)	NN(1,2,3) **SS(1,2,3,4,5) MF(1,2,3,4,5)** FV(1) CP(1,2) PP(1) **NS(4)**	**NN(1,2,3,4,5) SS(1,2,3,4,5) MF(1,2,3,4,5)** CP(1,2,4) FV(1) PP(1,2) **NS(4)**	**NN(2,4,5) SL(2,4,5) NS (4)** SS (2)
Biometrics ¦X¦ *Call*		X	SL(1,2)	SL(1,2) MF(1)	SL(1)	SL(1) MF(1,2,4)	MF(1,2,4)	MF(1,2)	**NN(1,2,3,4,5) SL(1,2,3,4,5)** MF(1,2) **NS(4)**	**NN(1,2,3,4,5)** SL(1,2,4) MF(1,2) **NS(4)**	
***G. n. occidentalis* (Ecuador)**											
Plumage ¦X¦ *Song*	?		X	MF(1,2) FV(1) PP(1)	SL (1,2) NN(1) MF(1,2,4) FV(1,2) CP(1) PP(1)	NN(1) SS(1) FV(1)	SL (1) NN(1,2) SS(1,2) MF(1) FV(1) CP(1)	SL (1) NN(1,2) **SS(1,2,3,4,5)** FV(1) CP(1) PP(1)	**NN(1,2,3,4,5) SS(1,2,3,4,5) MF(1,2,3,4,5)** FV(1) CP(1,2) PP(1,2) **NS(4)**	SL (1) **NN(1,2,3,4,5) SS(1,2,3,4,5) MF(1,2,3,4,5)** FV(1) CP(1,2) PP(1,2,3) **NS(4)**	**NN (2,4,5) SL (2,4,5) NS (4)** SS(2)
Biometrics ¦X¦ *Call*	TR(1) BW(1,4)	BW(2,4)	X	MF(1,2,4)	SL(1)	SL(1,2,4) MF(1)	MF(1,2,4)	SL(1,2) MF(1)	**NN(1,2,3,4,5) SL(1,2,3,4,5) MF(1,2,3,5) NS(4)**	**NN(1,2,4,5) SL(1,2,4,5)** MF(1,2,4) **NS(4)**	
***G. n. nana* (East Andes)**											
Plumage ¦X¦ *Song*	Less olivaceous back, darker breast	Less olivaceous back, darker breast	Less olivaceous back, darker breast	X	NN(1) SL(1) SS(1) FV(1,2) CP(1) PP(1)	SS(1) **MF(1,2,3,4,5)**	SL(1) NN(1,2) **MF(1,2,3,5)** SS(1,2,4) FV(1) CP(1) PP(1)	SL (1) NN(1,2) **SS(1,2,3,4,5)** MF(1,2,3) FV(1) PP(1)	NN(1,2,3,4) **SS(1,2,3,4,5)** MF(1,2,3,4) FV(1) CP(1,2) PP(1,2) **NS(4)**	**NN(1,2,3,4,5) SS(1,2,3,4,5) MF(1,2,3,4,5)** FV(1) CP(1,2,4) PP(1,2) **NS(4)**	**NN (2,4,5) SL (2,4,5) NS (4)** SS (2)
Biometrics ¦X¦ *Call*				X	SL(1) MF(1,2)	SL(1,2) **MF(1,2,3,4,5)**	**MF(1,2,3,4,5)**	SL(1) **MF(1,2,3,4,5)**	**NN(1,2,3,4,5) SL(1,2,3,4,5)** MF(1,2,3) **NS(4)**	**NN(1,2,4,5) SL(1,2,4,5)** MF(1) **NS(4)**	SL(2)
***G. n. hallsi* (Yariguíes)**											
Plumage ¦X¦ *Song*	More olivaceous back, paler breast	More olivaceous back.	More olivaceous back	More olivaceous back, paler breast	X	SL (1) NN(1,2) SL (2) **MF(1,2,3,4,5)** FV(1,2)	**NN(1,2,3,4,5)** SL (1,2,3) SS(1) **MF(1,2,3,4,5) FV(1,2,3,5)**	**NN(1,2,3,4,5) SS(1,2,3,4,5)** SL (1,2) **MF(1,2,3,4,5)** FV(1,2,4)	SL (1) **NN(1,2,3,4,5) SS(1,2,3,4,5) MF(1,2,3,4,5)** FV(1) CP(1) PP(1,2,3,4) **NS(4)**	SL (1,2,4) **NN(1,2,3,4,5) SS(1,2,3,4,5) MF(1,2,3,4,5)** FV(1) CP(1) **PP(1,2,3,4,5)** NS(4)	**NN(2,4,5) SL(2,4,5) NS(4)** SS(2) **FV(2,5)**
Biometrics ¦X¦ *Call*	TL(1) BW(1,2,4)	BW(1)	TR(4) BW(1,2,4)		X	MF(1,4)	MF(1,2,4)	MF(1,2)	**NN(1,2,3,4,5) SL(1,2,3,4,5) MF(1,2,3,5) NS(4)**	**NN(1,2,4,5)** SL(1,2,4) MF(1,2,4) **NS(4)**	SL(2)

	G. n. occidentalis? (West Andes)	*G. n. occidentalis* (Central Andes)	*G. n. occidentalis* (Ecuador)	*G. n. nana* (East Andes)	*G. n. hallsi* (Yariguíes)	*G. n. nanitaea* (Tamá–Santander)	*G. n. nanitaea* (Mérida)	*G. n. olivascens* (Coastal Cordillera)	*G. n. cumanensis* (Caripe)	*G. n. pariae* (Paria)	*G. kukenamsis* (tepuis)
***G. n. nanitaea* (Tamá-Santander)**											
Plumage ¦X¦ Song	More olivaceous back, paler breast	More olivaceous back	More olivaceous back	More olivaceous back, paler breast		X	SL(1) NN(1) SS(1) FV(1)	SL (1) NN(1,2) **SS(1,2,3,4,5)** FV(1)	NN(1,2,4) **SS(1,2,3,4,5) MF(1,2,3,4,5)** FV(1) CP(1) PP(1,2,4) **NS(4)**	**NN(1,2,3,4,5) SS(1,2,3,4,5) MF(1,2,3,4,5)** FV(1) CP(1,2) PP(1,2,3) **NS(4)**	**NN (2,4,5) SL (2,4,5) NS (4)**
Biometrics ¦X¦ Call	TR(1)		BW(4)			X	SL(4)		**NN(1,2,3,4,5) SL(1,2,3,4,5) MF(1,2,3,5) NS(4)**	**NN(1,2,4,5) SL(1,2,3,4,5) MF(1,2,3,4,5) NS(4)**	**SL(2,5)** MF(2)
***G. n. nanitaea* (Mérida)**											
Plumage ¦X¦ Song	More olivaceous back, paler breast	More olivceous back	More olivaceous back	More olivaceous back, paler breast			X	NN(1) SS(1,2,3,4)	SL (1) NN(1) **SS(1,2,3,4,5) MF(1,2,3,4,5)** FV(1,2) **PP(1,2,3,4,5) NS(4)**	SL (1) NN(1,2) **SS(1,2,3,4,5) MF(1,2,3,4,5)** FV(1,2) **PP(1,2,3,4,5) NS(4)**	**NN (2,4,5) SL (2,4,5) NS (4)**
Biometrics ¦X¦ Call	BW(2)				**BW(1,2,4,5)**		X		**NN(1,2,3,4,5) SL(1,2,3,4,5) MF(1,2,3,5) NS(4)**	**NN(1,2,4,5)** SL(1,2,4) **MF(1,2,3,4,5) NS(4)**	**MF(2,5)**
***G. n. olivascens* (Coastal Cordillera)**											
Plumage ¦X¦ Song	More olivaceous back, paler breast	More olivaceous back, paler breast	More olivaceous back, paler breast	More olivaceous back, paler breast	More olivaceous back, paler breast	More olivaceous back, paler breast	More olivaceous back, paler breast	X	**SS(1,2,3,4,5) MF(1,2,3,4,5)** FV(1,2) **PP(1,2,3,4,5)**	SL (1) **SS(1,2,3,4,5) MF(1,2,3,4,5)** FV(1,2) **PP(1,2,3,4,5)**	**NN (2,4,5) SL (2,4,5) NS (4)**
Biometrics ¦X¦ Call	WI(1) BW(1,2,4)	WI(1) BW(1,2,4)	BW(1,2,4)	WI(1) BW(1,2,4)	**BW(1,2,3,4,5)**	BW(4)	WI(1) BW(1,2,4)	X	**NN(1,2,3,4,5) SL(1,2,3,4,5) MF(1,2,3,5) NS(4)**	**NN(1,2,4,5)** SL(1,2,4) **MF(1,2,3,4,5) NS(4)**	**MF(2,5)**
***G. n. cumanensis* (Caripe)**											
Plumage ¦X¦ Song	More extensive white belly, more extensive white collar, more ferruginous-red on breast, longer eyebrow, and presence of pale postocular								X	MF(1)	**NN (2,4,5) SS (2,4,5) MF (2,4.5) SL (2,4,5) NS (4)** FV (2)
	More olivaceous back	More olivaceous back	More olivaceous back	More olivaceous back	More intensely green back	More intensely green back	More intensely green back	More intensely green back	X		
Biometrics ¦X¦ Call	WI(1,2,4) TL(1,2) TR(1,2,4) BW(1,2,3,4) **BS(4)**	WI(1) TL (1,2,4) TR(1,2,4) BW(1,2,4) **BS(4)**	WI(1,4) **TL(1,2,3,4,5)** TR(1,2,4) **BW(1,2,3,4,5)** **BS(4)**	WI(1,2,4) TL(1,2,4) TR(1,2,4) BW(1,2,4) **BS(4)**	WI(4) TL(1,2,3,4) TR(1,2,4) BW(4) **BS(4)**	**TL(1,2,3,4,5)** TR(1,2,4) BW(4) **BS(4)**	WI(1) TL(1,2,3,4) TR(1,2,4) **BW(1,2,3,4,5)** **BS(4)**	**TL (1,2,3,4,5)** TR(1,2,4) **BW(1,2,3,4,5) BS(4)**	X	**SS(1,2,3,4,5)** MF(1)	NN(2,4) SL(2) **NS(4)**
***G. n. pariae* (Paria)**											
Plumage ¦X¦ Song	As *G. n. cumanensis* above									X	**NN (2,4,5) SS (2,4,5) MF (2,4.5) SL (2,4,5) NS (4)** FV (2) PP (2)
Biometrics ¦X¦ Call	WI (1,2) TL(1,2) **TR(1,2,3,4,5)** **BW(1,2,3,4,5)** **BS(4)**	WI(1,2) TL(1,2,4) **TR(1,2,3,4,5)** BL(1,2) **BW(1,2,3,4,5)** **BS(4)**	WI(2) **TL(1,2,3,4,5)** **TR(1,2,3,4,5)** **BW(1,2,3,4,5)** **BS(4)**	WI(1,2,4) TL(2,4) **TR(1,2,3,4,5)** BL(1,2) **BW(1,2,3,4,5)** **BS(4)**	WI(4) **TL(1,2,3,4,5)** **TR(1,2,4,5)** BW(1,2,4) **BS(4)**	WI(1) **TL(1,2,3,4,5)** **TR(1,2,3,4,5)** BL(1) BW(2,4) **BS(4)**	WI(1) TL(1,2,4) **TR(1,2,3,4,5)** BL(1) **BW(1,2,3,4,5)** **BS(4)**	WI(1) **TL(1,2,3,4,5)** **TR(1,2,3,4,5)** BL(1) **BW(1,2,3,4,5) BS(4)**	BW(1,2)	X	NN(2,4) **NS(4)**
***G. kukenamsis* (tepuis)**											
Plumage	Paler brown back	Paler brown back	Paler brown back	Paler brown back, paler breast	Less olivaceous back, darker breast	Less olivaceous back, darker breast	Less olivaceous back, darker breast	Less olivaceous back, darker breast	Less olivaceous back, darker breast, less extensive white belly and less extensive white collar, less ferruginous-red on breast, shorter eyebrow, and absence of pale postocular		X
Biometrics	WI(1,2) TL(1,2) **TR(1,2,3,4,5)** BW(1,2,4)	WI(1) TL(1,2) **TR (1,2,3,4,5)** BW(1,2)	WI(1) TL(1,2,4) **TR(1,2,3,4,5)** **BW(1,2,3,4,5)**	WI(1,2) **TR(1,2,3,4,5)** BW(1)	TL(1,2,4) **TR(1,2,3,4,5)**	TL(1,2,3,4) **TR(1,2,3,4,5)**	WI(1) TL(1,2) **TR(1,2,3,4,5)** BW(1,2,3,4,5)	TL(1,2,3) **TR(1,2,3,4,5)** BW(1,2,3,4,5)	**BS(4)**	TR(1) BL(1) BW(1,2,3,4) **BS(4)**	X

Redescription of Cipó Canastero *Asthenes luizae*, with notes on its systematic relationships

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Cipó Canastero *Asthenes luizae* is a recently described furnariid from Alto da Boa Vista, Serra do Cipó (19°17'S, 43°34'W), Minas Gerais, south-east Brazil (Vielliard 1990). This area occupies less than 10 km^2, of *campos rupestres*, a distinctive landscape of the Espinhaço highlands, comprising many endemic herbs and shrubs growing on and among rocky outcrops (Fig. 1) (Menezes & Giulietti 1986, 2000, Collar *et al.* 1992, Eiten 1992, Giulietti *et al.* 1997, Gottsberger & Silberbauer-Gottsberger 2006). The species was known only from the type locality for eight years following its description, which led some authors to consider it threatened (Pearman 1990, Collar *et al.* 1992, Andrade 1998, BirdLife International 2000, 2004). Nevertheless, *A. luizae* was found in other areas north of the type locality, all in the Central Brazilian hills and tablelands (Endemic Bird Area 073; Stattersfield *et al.* 1998), including three protected areas: Serra do Cipó National Park, Pico do Itambé State Park, and Rio Preto State Park (Andrade *et al.* 1998, Cordeiro *et al.* 1998, Vasconcelos 2002, Vasconcelos *et al.* 2002, Bencke *et al.* 2006). Consequently, the species was not treated as threatened in the recent revision of the threatened fauna of Brazil (Machado *et al.* 2005).

The species' original description was based on two males, an adult and immature (Vielliard 1990), housed in Frederico Lencioni's private collection. Currently, the holotype is deposited in the Museu de Zoologia da Universidade de São Paulo (MZUSP 73831), but the paratype remains in Lencioni's collection (no. 568). An additional adult male, deposited in the Coleção Ornitológica do Departamento de Zoologia da Universidade Federal de Minas Gerais, Belo Horizonte (DZUFMG 2855), was collected *c.*170 km north of the species' known range, but it proved impossible to determine whether small plumage differences from the holotype represent individual or geographical variation (Vasconcelos *et al.* 2002). Morphology and measurements of female and juvenile plumages are still undescribed.

Unfortunately, the original description of *A. luizae* is not very precise. Plumage coloration was not described with reference to a catalogue, and no details were given as to the extent of rufous in the tail, an important character for assessing systematic affinities within Synallaxinae. Thus, our aim here is to redescribe *A. luizae* using the holotype and ten specimens obtained in March 2000–September 2006 from the following localities, all in the Espinhaço range: Alto da Boa Vista (type locality), Santana do Riacho municipality; Serra do Barro Preto (18°36'S, 43°53'W), Gouvêa municipality; Três Barras (18°30'S, 43°26'W), Serro municipality; Serra Resplandecente (17°02'S, 43°20'W), Itacambira municipality; and Campina do Bananal (16°51'S, 43°02'W), Botumirim municipality. Specimens are deposited in the Coleção Ornitológica do Departamento de Zoologia da Universidade Federal de Minas Gerais, Belo Horizonte (DZUFMG), and in the Museu de História Natural de Taubaté, Taubaté (MHNT). Unfortunately, the paratype could not be analysed. Table 1 presents collection data for the analysed specimens of *A. luizae*. We also provide data on the plumage and measurements of females and a juvenile, and discuss the species' taxonomic relationships.

Plumage descriptions were based on Munsell *Soil color charts* (2000). External topographic anatomy nomenclature follows Meyer de Schauensee (1982) and Clark (1993). Measurements were taken using electronic digital callipers. Measurements taken were: bill-width (at anterior edge of nares), bill-depth (at anterior edge of nares), nares to tip, culmen from base (at skull), wing-chord (unflattened), tarsus, tail and total length. Where possible, specimens were weighed using pesolas.

Specimens of other species of *Asthenes* were studied in the following institutions: American Museum of Natural History, New York (AMNH), Academy of Natural Sciences of Philadelphia, Philadelphia (ANSP), Field Museum of Natural History, Chicago (FMNH), Louisiana State University Museum of Zoology, Baton Rouge (LSUMZ), Museo de Historia Natural 'Javier Prado', Lima (MJPL), Museu de Zoologia da Universidade de São Paulo, São Paulo (MZUSP), US National Museum of Natural History, Washington DC (USNM), and Zoological Museum, University of Copenhagen (ZMUC).

Redescription of holotype.—Upperparts, from forehead to rump, very dark greyish brown (10YR 3/2). Uppertail-coverts dark greyish brown (10YR 4/2). Lores pale yellow (2.5Y 8/2) with apex of feathers black (5YR 2.5/1). Fine superciliary pale yellow (2.5Y 8/2), becoming light grey (10YR 7/1.5) posteriorly. Ear-coverts black (5YR 2.5/1) with fine stripes white (2.5Y 8/1). Malar light grey (10YR 6.5/1). Chin white (2.5Y 8/1). Throat feathers black (5Y 2.5/1), basally red (2.5YR 4/8) and stripes white (2.5Y 8/1). Sides of neck and breast greyish brown (10YR 5/2), becoming light grey (10YR 7/2) in centre of breast. Belly light grey (10YR 7/2). Flanks and thighs greyish brown (10YR 5/2). Undertail-coverts brown (10YR 5/3).

Tail graduated, with 12 rectrices, appearing in dorsal aspect mostly very dark greyish brown (10YR 3/2), with fringes rufous (7.5YR 4/6), and, from below, mostly rufous with very dark greyish brown in the centre. The three outermost pairs of rectrices are rufous, inconspicuously washed very dark greyish brown at the base of proximal webs. On each successively longer rectrix the amount of very dark greyish brown increases, whilst the amount of rufous decreases. In the fourth outermost pair, rufous concentrates principally on the feather's tip, on both margins of the proximal web (narrow and inconspicuous on the inner margin) and on distal web, becoming very dark greyish brown at the feather's base. The fifth outermost pair is almost entirely very dark greyish brown, with rufous narrow and inconspicuous external margins only on the distal web. Central rectrices are entirely very dark greyish brown.

Upperwing-coverts very dark grey (10YR 3/1), finely and inconspicuously fringed yellowish red (5YR 5/8). Alula very dark greyish brown (10YR 3/2) with fine fringe white (10YR 8/1) on distal margin. Remiges very dark greyish brown (10YR 2.5/2); primaries have inconspicuous narrow fringes light brownish grey (10YR 6/2) on distal margin. Underwing-coverts yellowish red (5YR 5/6). Bend of wing white (10YR 8/1).

Soft-part colours noted in the original label are: irides brown and tarsus black.

Description of female from type locality.—This female (DZUFMG 5331) has the forehead, crown, nape and hindneck very dark greyish brown (10YR 3/2), becoming very dark grey (10YR 3/1.5) on mantle, scapulars and rump. Uppertail-coverts dark grey (10YR 4/1.5). Lores white (2.5Y 8/1) with feather apex black (5YR 2.5/1). Sides of neck and breast grey (10YR 5.5/1), becoming light grey (10YR 7/1) in centre of breast. Belly light grey (10YR 7.5/1). Flanks and thighs greyish brown (10YR 5/1.5). Superciliary, auriculars, malar, chin, throat and undertail-coverts similar to holotype.

Tail similar to holotype, but with very dark brown (10YR 2.5/2) over same regions that in the holotype are very dark greyish brown (10YR 3/2). Central rectrices very dark brown with very narrow and inconspicuous rufous margins on distal web.

Upperwing- and underwing-coverts, alula and bend of wing similar to holotype. Remiges very dark grey (10YR 2.5/1); primaries have inconspicuous narrow fringes light brownish grey (10YR 6/2) on distal margin; secondaries with inconspicuous fringes light brownish grey on both margins.

Soft-part colours: irides dark brown, tarsus grey, upper mandible black, lower mandible grey with black tip.

Plumage variation in adults.—Mantle, scapulars and rump are very dark grey (10YR 3/1.5) in all except the holotype, which has these parts very dark greyish brown (10YR 3/2), and no evident contrast with the head in the latter specimen. Uppertail-coverts vary from dark greyish brown (10YR 4/2) (MZUSP 73831), dark grey (10YR 4/1.5) (DZUFMG 5327–5332, MHNT 4825), to very dark grey (10YR 3/1.5) (DZUFMG 2855, 5325). Throat feathers with a reddish base are more frequent in the anterior part of the gular patch, being very inconspicuous and almost absent in two specimens (DZUFMG 2855, 5328). The significance of this variation is unknown, as these two specimens represent both sexes and were collected at different sites (Table 1). Those collected at Três Barras possess a blacker gular patch and narrower white stripes in the throat (Fig. 2). Except the holotype, all have the neck- and breast-sides grey (10YR 5.5/1), becoming light grey (10YR 7/1) over the central breast, and belly light grey (10YR 7.5/1).

All have the rectrices similar to DZUFMG 5331, admixed very dark brown and rufous, except the holotype, which has these feathers very dark greyish brown and rufous. Some specimens have the three outermost pairs of rectrices inconspicuously washed very dark brown at the tips (DZUFMG 2855, 5325, 5327, 5331, 5332, MHNT 4825). In the fifth outermost pair, the rufous appears as narrow and inconspicuous external margins only on the distal web (DZUFMG 5325, 5328, 5330, 5331, MZUSP 73831, MHNT 4825), or on both webs (DZUFMG 2855, 5327, 5329, 5332). The central rectrices are entirely very dark brown, sometimes with very narrow and inconspicuous rufous margins to the distal web (DZUFMG 5331, 5332), or on both webs (DZUFMG 2855, 5328, 5329). The significance of this variation is also unknown as each of these characters was found in birds in fresh plumage from different localities.

All specimens have the remiges very dark grey, except the holotype, which has these feathers very dark greyish brown. Most specimens (DZUFMG 2855, 5325, 5328–5332, MHNT 4825) possess inconspicuous light brownish-grey fringes on both margins of the secondaries.

Based on those adults analysed, we found no differences between the sexes, and we also found no evidence of geographical variation, except the darker gular patch in those from Três Barras (Fig. 2). In comparing DZUFMG 2855, from Campina do Bananal, to the holotype, it is impossible to know if the observed differences between them (Vasconcelos *et al.* 2002) pertain to geographic or individual variation. Based on the additional specimens gathered recently, we conclude that the holotype is in worn plumage, with many degraded feathers, thereby probably explaining the browner tones compared to other specimens, including the adult female from the type locality (DZUFMG 5331). Two other worn specimens (DZUFMG 5327, 5332), albeit less so than the holotype, exhibit slightly paler central rectrices compared to the rest of the series.

We found small variation in soft-part colours of adults. All have dark brown irides and a black upper mandible. Tarsi vary between greenish grey (DZUFMG 5327–5330), grey (DZUFMG 2855, 5325, 5331) and dark grey (DZUFMG 5332, MHNT 4825). Most specimens possess the lower mandible grey with a black tip (DZUFMG 2855, 5325, 5327, 5329–5332, MHNT 4825), with only one (DZUFMG 5328) having a grey lower mandible with a black tip and base.

TABLE 1

Collection data for specimens of Cipó Canastero *Asthenes luizae* utilised in this study. Localities are presented from south (type locality) to north.

Registration number	Locality	Elevation	Sex	Age	Date
MZUSP 73831 (holotype)	Alto da Boa Vista, Serra do Cipó	1,100 m	Male	Adult	14 December 1985
DZUFMG 5331	Alto da Boa Vista, Serra do Cipó	1,320 m	Female (ovary 7.0 × 2.6 mm)	Adult (skull 20% pneumatised)	1 May 2005
DZUFMG 5332	Serra do Barro Preto	1,300 m	Male (testes 5.7 × 4.1 mm)	Adult (skull 35% pneumatised)	18 September 2006
DZUFMG 5328	Três Barras	1,230 m	Female (ovary 5.0 × 2.2 mm)	Adult (skull 30% pneumatised)	24 April 2004
DZUFMG 5329	Três Barras	1,230 m	Male (testes 1.7 × 1.0 mm)	Adult (skull 30% pneumatised)	24 April 2004
DZUFMG 5330	Três Barras	1,230 m	Female (ovary 6.0 × 3.5 mm)	Adult (skull 30% pneumatised)	24 April 2004
DZUFMG 5327	Serra Resplandecente	1,250 m	Female (ovary 7.5 × 4.2 mm)	Adult (skull 25% pneumatised)	4 September 2003
DZUFMG 2855	Campina do Bananal	1,320 m	Male (testes 2 × 1 mm)	Adult (skull 25% pneumatised)	1 March 2000
MHNT 4825	Campina do Bananal	1,250 m	Female (ovary 6.0 × 2.5 mm)	Adult (skull 25% pneumatised)	22 March 2003
DZUFMG 5325	Campina do Bananal	1,300 m	Female (ovary 6 × 3 mm)	Adult (skull 10% pneumatised)	23 March 2003
DZUFMG 5326	Campina do Bananal	1,270 m	Male (testes 0.9 × 0.6 mm)	Juvenile (skull 5% pneumatised)	23 March 2003

Description of juvenile.—The most noteworthy plumage difference compared to adults is that the chin and throat are light grey (10YR 6.5/1) (Figs. 1–2). The breast and belly are similar to adults, but washed inconspicuously greyish-brown (10YR 5/2) and brown (10YR 5/3). Soft-part colours are: irides dark brown, tarsus greenish grey, upper mandible black, lower mandible light grey with a black tip.

It is noteworthy that none of the specimens, including those considered adults on plumage, had the skull completely pneumatised. All adults had skull ossification of 10–35%. The juvenile had the skull 5% pneumatised (Table 1).

Measurements and mass.—Although the number of adults analysed is still small, it appears that there are no differences in measurements and mass between the sexes (Table 2). There is little evidence of strong size dimorphism in Furnariidae (Remsen 2003). Juvenile measurements fall within the same range (Table 2).

Systematic relationships.—As noted by Vuilleumier *et al*. (1992), in the original description, Vielliard (1990) did not present any evidence why *A. luizae* belongs within *Asthenes*. Pearman (1990) compared songs of *A. luizae* with *Asthenes m. modesta*, *A. humilis robusta*, *A. wyatti graminicola*, *A. d. dorbignyi* and *A. b. baeri*, and concluded that the song of *A. luizae* most recalled *A. d. dorbignyi*. He also concluded, based on plumage and vocalisations, that the closest relatives of *A. luizae* were possibly *A. dorbignyi* and *A. patagonica*.

TABLE 2

Morphometrics (see text for details of measurements) and body mass of Cipó Canastero *Asthenes luizae*. Values are mean ± SD, with range and *n* in parentheses.

Age and sex	Bill-width	Bill-depth	Nares to tip	Culmen	Wing-chord	Tarsus	Tail	Total length	Body mass
Adult males	3.10 ± 0.10 (2.98–3.19, 4)	3.87 ± 0.18 (3.63–4.05, 4)	11.50 ± 0.51 (10.85–11.96, 4)	18.61 ± 0.69 (17.69–19.16, 4)	69.95 ± 0.78 (69.43–71.09, 4)	24.69 ± 1.43 (23.25–26.67, 4)	86.78 ± 5.03 (79.74–91.66, 4)	188.00 ± 7.21 (182.00–196.00, 3)	30.50
Adult females	3.16 ± 0.23 (2.90–3.41, 6)	3.78 ± 0.07 (3.69–3.88, 6)	11.37 ± 0.60 (10.70–12.01, 6)	18.89 ± 0.77 (17.55–19.77, 6)	68.85 ± 1.68 (66.17–71.25, 6)	25.32 ± 0.50 (24.74–26.22, 6)	89.65 ± 2.91 (86.16–93.50, 6)	196.17 ± 7.83 (184.00–205.00, 6)	28.25 ± 2.66 (25.00–31.50, 4)
Juvenile male	3.01 (1)	3.78 (1)	11.11 (1)	19.23 (1)	70.52 (1)	24.60 (1)	90.41 (1)	189.00 (1)	24.00 (1)

In a recent phylogenetic analysis of nest architecture in Furnariidae, Zyskowski & Prum (1999), based on incomplete data for *A. luizae*, grouped the species in the same operational taxonomic unit as *A. pudibunda*, *A. cacto-*

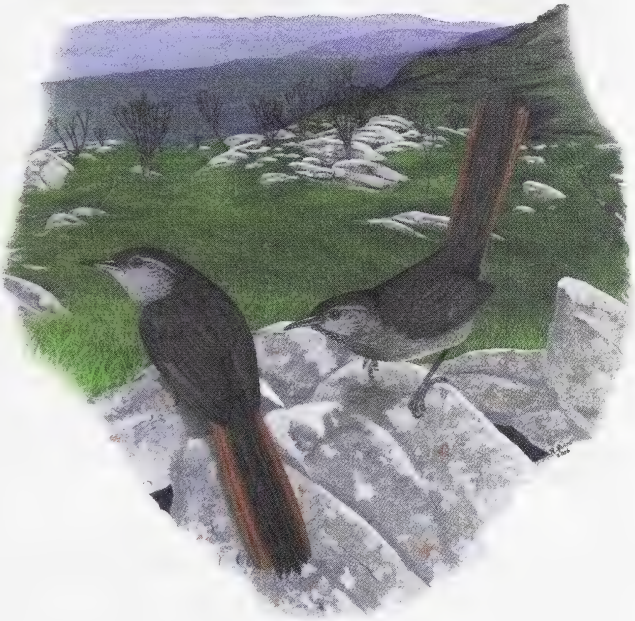

Figure 1. Juvenile (left) and adult Cipó Canastero *Asthenes luizae* in the *campos rupestres* of the Espinhaço range (Raphael Dutra)

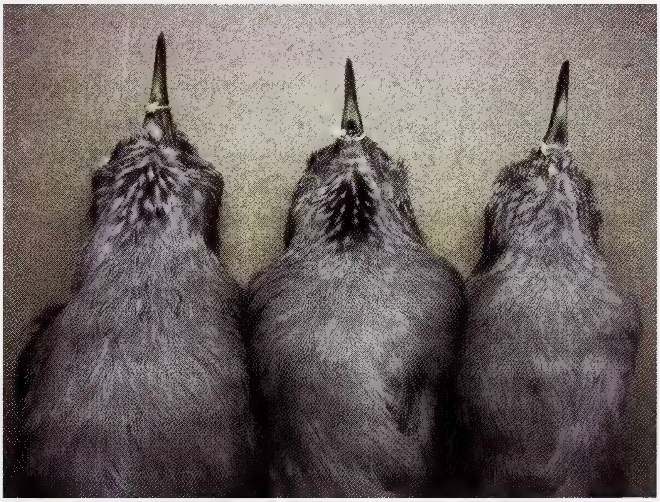

Figure 2. Gular patches of Cipó Canasteros *Asthenes luizae*, from left to right: adult male from Campina do Bananal (DZUFMG 2855), adult male from Três Barras (DZUFMG 5329), and juvenile male from Campina do Bananal (DZUFMG 5326) (Carlos Henrique de Faria Vasconcelos)

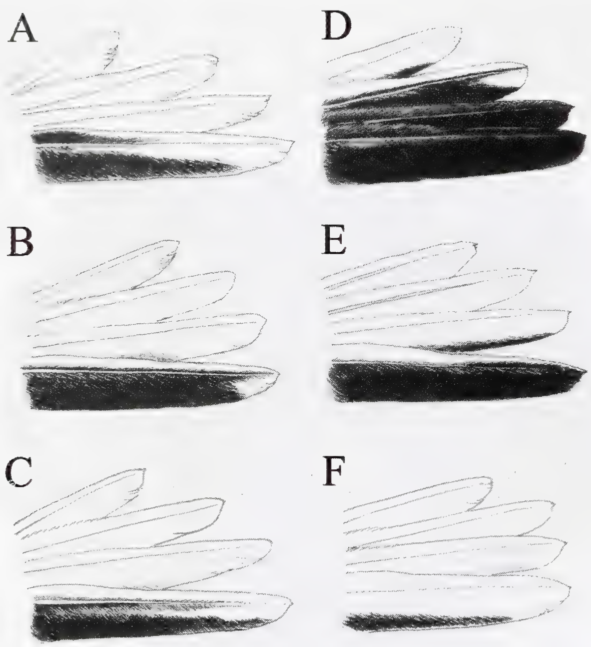

Figure 3. Tail patterns of different *Asthenes*: *A. luizae* (A); *A. (dorbignyi) huancavelicae* (B); *A. (d.) usheri* (C); *A. (d.) dorbignyi* (D); *A. berlepschi* (E); *A. baeri* (F) (Jon Fjeldså)

rum, *A. humicola*, *A.* (*dorbignyi*) *huancavelicae*, *A.* (*d.*) *arequipae*, *A.* (*d.*) *dorbignyi*, *A. berlepschi*, *A. steinbachi*, *A. baeri* and *A. patagonica*. However, based on morphological and nest architecture data, it appears that *Asthenes* is polyphyletic (Vaurie 1980, Narosky *et al.* 1983, Fjeldså & Krabbe 1990, Zyskowski & Prum 1999, Remsen 2003, de la Peña 2005), and this has now been confirmed molecularly (M. Irestedt *in litt.* 2007). Based on Pearman's (1990) and our field observations, *A. luizae* is a terrestrial species that forages usually on the ground and carries the tail cocked, a character common to many *Asthenes* (Vaurie 1980, Fjeldså & Krabbe 1990, Remsen 2003). Furthermore, the nest constructed mainly of sticks (Studer & Teixeira 1993, Remsen 2003, Gomes 2006) and plumage details place *A. luizae* within a group comprising *A. pyrrholeuca*, *A. berlepschi*, *A. steinbachi*, *A. baeri*, *A. patagonica* and the *A. dorbignyi* complex (Fig. 3; see Fjeldså & Krabbe 1990, Remsen 2003). Diagnostic plumage characters comprise the total absence of stripes, the distinctive gular patch from pale orange to black (albeit absent in some populations or plumages), more or less rufous-brown vent, and fairly long, graduated tail with rounded tips, blackish brown with distinctive rufous-brown sides. The distribution of rufous-brown in the tail (Fig. 3) is almost identical in *A. luizae* and some other taxa in this group, notably *A.* (*dorbignyi*) *huancavelicae*, *A.* (*d.*) *usheri* (with white outer rectrices) and two unnamed taxa in the central Peruvian Andes (see Pl. XXXVII in Fjeldså & Krabbe 1990), as well as *A. pyrrholeuca* and *A. baeri* of the Southern Cone. *A steinbachi* (north-west Argentina) has even more rufous in the tail, but other forms have less (Bolivian and north-west Argentine forms of *A. dorbignyi*, and *A. berlepschi*), or only a thin lateral stripe (unnamed form in southern Peru and *A. patagonica* of southern Argentina) (Fjeldså & Krabbe 1990, Narosky & Yzurieta 2003).

Furthermore, known juvenile plumages of other *Asthenes* generally possess a scaly pattern on the breast, although this is most obvious in forms with a pale creamy breast, and is not apparent in the darkest and greyish forms (e.g. a dark grey unnamed form from Peru and *A. luizae*).

As most traits shared by *A. luizae* and other populations occur in separate geographical areas from Patagonia to the Peruvian Andes, they may be plesiomorphic within the group, and therefore are not informative as to the closest relative of *A. luizae*. On geographical grounds we might assume that *A. luizae* is most closely related to *A. baeri* of the Chaco (see Silva 1995). With its dark and greyish coloration, *A luizae* comes close to *A. patagonica* and an unnamed form in southern Peru, but both these latter possess almost all-black tails, and we therefore assume that melanisation has occurred independently in these three populations. Finally, we must stress that, in the absence of any phylogenetic analysis, it is impossible to determine the precise evolutionary relationships of *A. luizae*.

Postscript

An additional adult male *Asthenes luizae* (DZUFMG 5673) in worn plumage, collected at Campina do Bananal on 4 January 2008, also shows differences in the tone of the upperparts compared to the rest of the series, confirming that the holotype's different coloration could be related to its degraded feathers.

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Taxonomy, vocalisations, syringeal morphology and natural history of *Automolus roraimae* (Furnariidae)

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The White-throated Foliage-gleaner *Automolus roraimae* has been a subject of taxonomic and nomenclatural debate almost since its description in 1884. Described as *Philydor albigularis* by Salvin & Godman (1884) from Mt. Roraima, Guyana, it was transferred to *Automolus* by Sclater (1890). Hellmayr (1917) proposed that the name *Philydor albigularis* was a homonym of *Philydor albogularis* Spix (*Av. Bras.* 1, 1824: 74), and was therefore unavailable. Because both *Philydor albigularis* Salvin & Godman, 1884, and *Philydor albogularis* Spix, 1824, had been subsequently transferred to *Automolus*, Hellmayr determined that the name *Automolus albigularis* was also a homonym of *Automolus albogularis* (now *A. leucophthalmus*), and was equally unavailable. Hellmayr (1917: 199) proposed a new name, *Automolus roraimae*, and designated the type as being from the Venezuelan side of Mt. Roraima. Some subsequent authors (e.g. Peters 1951, Vaurie 1980) interpreted nomenclatural rules differently, and retained the name of *A. albigularis*, whereas others (e.g. Meyer de Schauensee 1970) followed Hellmayr (1917) in using *A. roraimae*. E. Eisenmann (p. 342 *in* Vaurie 1980), invoking Arts. 57 and 59(a) of the *International code of zoological nomenclature*, determined that the names *albigularis* and *albogularis* represent homonymous variable spellings, and are therefore primary homonyms under the Code. This solidified Hellmayr's (1917) interpretation, and subsequent authors (e.g. Ridgely & Tudor 1994, Hilty 2003, Remsen 2003) have adhered to the name *Automolus roraimae*.

However, confusion surrounding *Automolus roraimae* did not end with the resolution of its name. Wetmore & Phelps (1956) described *Philydor hylobius* (Neblina Foliage-gleaner) from two specimens (one tail-less adult and one juvenile) collected on Cerro de la Neblina in southernmost Venezuela. Mayr (1971) followed Wetmore & Phelps in recognising *P. hylobius*, and noted its similarity and probable relationship to the Black-capped Foliage-gleaner *P. atricapillus* of the Atlantic Forest of south-east Brazil. Vaurie (1980: 277) went further, stating that '*hylobius* needs more study, but seems to represent only an isolated population of *Philydor atricapillus*.' Dickerman *et al.* (1986) subsequently demonstrated that the two specimens of '*Philydor hylobius*' were, in fact, an erythristic adult and a juvenile of *Automolus roraimae*, differing from typical adults primarily in the ochraceous-tawny (rather than creamy white) supercilium and throat. The juvenile differed further in the presence of dusky scalloped fringes to the ventral feathers. Thus, *Philydor hylobius* Wetmore & Phelps, 1956, is a junior synonym of *Automolus roraimae* Hellmayr (Dickerman *et al.* 1986).

Throughout the period of nomenclatural confusion surrounding *Automolus roraimae* there has been ongoing speculation as to whether the species belongs in *Automolus*. Ridgely & Tudor (1994) suggested that it is better placed in *Philydor*, where it was described. Kratter & Parker (1997) seemed to suggest a closer relationship of *A. roraimae* to the genus *Syndactyla*, and Hilty (2003: 495) noted that whereas the species is 'almost certainly not an *Automolus*' its plumage characters are suggestive of *Philydor*, and its vocalisations of *Syndactyla* and *Anabazenops*. Remsen (2003) in the most comprehensive and recent treatment of the Furnariidae, reiterated all of these possibilities, but retained *roraimae* in *Automolus* pending further analysis.

During field work in the Sierra de Lema, Bolívar, Venezuela (KJZ) and Mt. Roraima, Guyana (MBR), we observed and tape-recorded multiple White-throated Foliage-gleaners. Our observations and recordings caused us to independently conclude that, based on vocal and ecological characters, it should be transferred from *Automolus* to *Syndactyla*. Generic transfers within the so-called 'foliage-gleaner clade' (subfamily Philydorinae) have been commonplace (Remsen 2003), particularly in recent years, as taxonomists have had access to a suite of vocal, ecological and molecular data unavailable to earlier workers (Parker *et al.* 1995, Kratter & Parker 1997, Robbins & Zimmer 2005). In an earlier paper (Robbins & Zimmer 2005), we presented evidence that the Planalto Foliage-gleaner (previously *Philydor dimidiatum*) should be transferred to *Syndactyla*. Here, we present vocal, syringeal, behavioural and ecological data that lead us to believe that *Automolus roraimae* is more closely related to species currently included in *Syndactyla* than to species currently in *Automolus* or *Philydor*.

Methods

We assume that vocalisations of foliage-gleaners, like those of other suboscines, are mostly or entirely inherited (Kroodsma 1984, 1989, Kroodsma & Konishi 1991), and consequently provide potentially informative characters for systematic study (Parker *et al.* 1995, Kratter & Parker 1997, Zimmer 1997, 2002, Remsen 2003). To analyse vocalisations, we assembled tape-recordings of all but one (*Philydor novaesi*) of the currently recognised species of *Automolus*, *Syndactyla*, *Philydor*, *Anabazenops* and *Simoxenops*. Our inventory provided sufficient material for most species in these groups, but we supplemented it with material from other recordists, and, in three instances, with material from commercially available compilations of bird recordings (see below). Sample sizes (=number of individuals) for each species are as follows: *Automolus roraimae* (9); *A. infuscatus* (79); *A. paraensis* (39); *A. leucophthalmus* (102); *A. ochrolaemus* (73); *A. rubiginosus* (8); *A. melanopezus* (7); *A. rufipileatus* (39); *Philydor rufum* (21); *P. lichtensteini* (35); *P. pyrrhodes* (6); *P. erythropterum* (15); *P. erythrocercum* (23); *P. atricapillus* (20); *P. ruficaudatum* (7); *Syndactyla subalaris* (22); *S. rufosuperciliata* (40); *S. guttulata* (1); *S. ruficollis* (8); *S. dimidiata* (15); *Simoxenops ucayalae* (14); *Anabazenops dorsalis* (28); and *Anabazenops fuscus* (38). We made auditory comparisons of all recordings, and visual comparisons of spectrograms of each species. Vocalisations selected for illustration here were deemed representative based on auditory comparison of the entire inventory, and on visual comparison of spectrograms of a smaller sample. Data accompanying recordings reproduced as spectrograms are provided in the figure legends. Locations and recordists for all recordings examined are given in Appendix 1.

Our study was conducted in conjunction with investigations into the taxonomic relationships of *Syndactyla dimidiata* (Robbins & Zimmer 2005), *Automolus infuscatus* (Zimmer 2002) and *A. leucophthalmus* (Zimmer 2008). In those papers, we presented spectrograms of *Syndactyla ucayalae*, six species of *Philydor* (*lichtensteini*, *atricapillus*, *erythropterum*, *erythrocercum*, *pyrrhodes* and *rufum*), and four species of *Automolus* (*infuscatus*, *paraensis*, *leucophthalmus* and *rufipileatus*). Additionally, Kratter & Parker (1997) published spectrograms of *Anabazenops fuscus* and *A. dorsalis*. Rather than duplicate previous work, we refer readers to those publications to view spectrograms of the vocal characters described verbally below. These spectrograms are cross-referenced in the Results section.

To facilitate interpreting our vocal data the following commercial sound compilations should be consulted: *Syndactyla rufosuperciliata* (Schulenberg 2000b); *S. subalaris* (Moore *et al.* 1999, Schulenberg 2000b); *S. guttulata* (Boesman 1999); *S. ruficollis* (Coopmans *et al.* 2004); *Simoxenops striatus* (Schulenberg 2000a); *S. ucayalae* (Schulenberg *et al.* 2000, Marantz &

Zimmer 2006); *Philydor rufum* (Moore *et al.* 1999, Lysinger *et al.* 2005); *P. fuscipenne* (Jahn *et al.* 2002); *P. erythrocercum* (Moore 1996, Schulenberg 2000a, Schulenberg *et al.* 2000, Lysinger *et al.* 2005, Marantz & Zimmer 2006); *P. pyrrhodes* (Moore 1996, Schulenberg *et al.* 2000, Marantz & Zimmer 2006); *P. erythropterum* (Moore 1996, 1997, Schulenberg *et al.* 2000, Marantz & Zimmer 2006); *P. ruficaudatum* (Schulenberg *et al.* 2000, Lysinger *et al.* 2005, Marantz & Zimmer 2006); *Anabazenops dorsalis* (Schulenberg *et al.* 2000, Lysinger *et al.* 2005, Marantz & Zimmer 2006); *Automolus ochrolaemus* (Schulenberg *et al.* 2000, Jahn *et al.* 2002, Marantz & Zimmer 2006); *A. infuscatus* (Schulenberg *et al.* 2000); *A. paraensis* (Marantz & Zimmer 2006); *A. rufipileatus* (Schulenberg *et al.* 2000, Marantz & Zimmer 2006); *A. rubiginosus* (Schulenberg *et al.* 2000, Jahn *et al.* 2002, Lysinger *et al.* 2005); and *A. melanopezus* (Schulenberg *et al.* 2000). Note that recordings from these sources are not included in our inventory, although the recordings of *Simoxenops striatus* (T. A. Parker recording from Bolivia; Schulenberg 2000) and *Philydor fuscipenne* (M. Lysinger recordings; Jahn *et al.* 2002) were consulted.

For comparison, vocalisations were categorised as loudsongs or calls. Loudsongs were consistently patterned multi-note vocalisations (Isler *et al.* 1997) given seemingly in the context of territorial advertisement. Vocalisations characterised as calls usually were structurally simple (typically involving well-spaced repetition of identical notes or pairs of notes), and most often were given in the context of contact notes between mates, as aggression calls during territorial conflicts with conspecifics, or in response to playback. Exceptions are noted in the results below. Our tape-recordings were made with Sony TCM-5000 and Sony TC-D5 Pro II recorders and Sennheiser ME-80, MKH-70 and ME-67 shotgun microphones. Spectrogram illustrations were made by P. R. Isler on a Macintosh G4 computer using Canary version 1.2.1 (Bioacoustics Research Program, Cornell Lab. of Ornithology, Ithaca, NY) and Canvas graphics software (version 5.0.3, Deneba Software, Miami, FL).

Syringes were cleared and double-stained following protocol in Cannell (1988), which distinguished cartilaginous (blue) and ossified (red) tissues. Several syringeal characters were analysed, including tracheal rings named as A and B elements, *Processi vocales* shape, *Membranae tracheales* characteristics, the *sternotrachealis*, *tracheolateralis* and *vocalis* muscles, and the presence or absence of some syringeal structures such as the 'drum' (a cylinder composed of two or more complete, fused A-elements). Nomenclature follows Ames (1971). Both before and after clearing and staining, syringes were placed in a small dissecting dish for examination under binocular magnification of 20–60×. CK examined syringeal characters of taxa listed in Appendix 2.

To assess plumage characters, we examined representative study skins of *Automolus roraimae*, and all currently recognised species in *Automolus, Philydor* (except *P. novaesi*), *Syndactyla* and *Anabazenops* (see Acknowledgments for institutions).

Behavioural and habitat data are from field work conducted by KJZ (Sierra de Lema, Bolívar, Venezuela) in 1987, 1991, 1992 and 2004, and by MBR (Guyana: north slope of Mt. Roraima, 05°06′N, 60°44′W) in 2001. All measurements used in behavioural data (distances, heights, etc.) are estimates.

Results

Vocalisations.—The loudsong of *A. roraimae* (Figs. 1a–c) is a slow, harsh rattle that peaks in amplitude mid-song and accelerates at the end. It typically comprises a stuttering prelude or preamble of higher frequency but lower amplitude notes with a distinctly nasal quality, that accelerates into a higher amplitude series of frequency-modulated, fairly evenly paced,

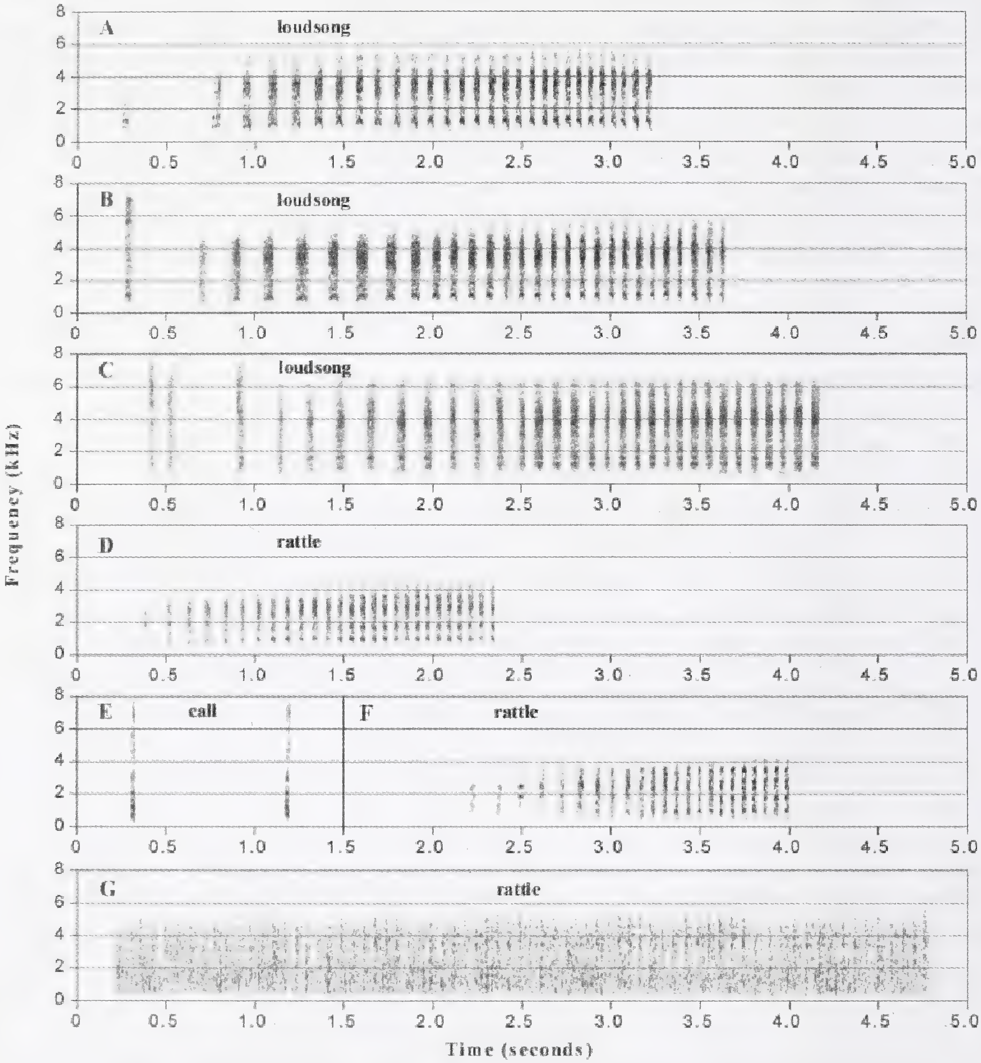

Figure 1. Vocalisations of *Automolus roraimae*. (a) loudsong, Mt. Roraima, Guyana (M. B. Robbins). (b) loudsong, Sierra de Lema, Bolívar, Venezuela (K. J. Zimmer). (c) loudsong, Sierra de Lema, Bolívar, Venezuela (K. J. Zimmer). (d) rattle, Sierra de Lema, Bolívar, Venezuela (K. J. Zimmer). (e) calls, Mt. Roraima, Guyana (M. B. Robbins). (f) rattle, Sierra de Lema, Bolívar, Venezuela (K. J. Zimmer). (g) long rattle, Sierra de Lema, Bolívar, Venezuela (K. J. Zimmer).

and strident, scratchy notes that may rise and fall somewhat in frequency (4–6 kHz) before accelerating to an abrupt conclusion. The harsh, distinctly scratchy quality of the notes is denoted in the spectrograms (Figs. 1a–c) by their relatively broad width. *Roraimae* loudsong was translated accurately by Hilty (2003: 494) as '*tzik . . . chek . . . tzik. .jjza-jjza-jjza-jza ja'ja'-ja'ja'ja*, the *jjza* series very harsh'. Loudsongs showed substantial variation, both within and among individuals. Songs varied greatly in overall length (2.0–5.0 seconds), and particularly in the presence or absence of a preamble, its length, and the extent to which it stuttered (vs. being evenly paced). These differences appeared to be exacerbated by playback and, depending on the degree of agitation, the differences within a single individual's songs could be marked. Some of the observed variation may be the result of sexual differences.

Apart from loudsongs, two other types of vocalisations were recorded from *roraimae*. One is a single-noted or doubled *TCHACK* or *ZHICK* (6–8 kHz) with a harsh yet nasal quality (Fig. 1e). These calls are given as contact notes between pair members that are separated while foraging. They are also given as aggression calls in response to playback. Individuals of a presumed pair gave single-note calls that differed qualitatively, with the calls of one bird sounding harsher, whereas the other sounded more nasal. The other vocalisation type is a harsh-sounding rattle, generally evenly paced but rising and falling slightly in frequency (*c*.4–6 kHz), and varying greatly in length (1–7 seconds) (Figs. 1d, 1f, 1g). As noted with loudsongs, variation in the rattle call length appears to be as great within individuals as between individuals, and is particularly susceptible to the influence of playback. Rattle calls are often given immediately before or after loudsongs, but are also given as antagonistic calls in response to playback. Birds responding to playback consistently give longer rattles.

Our song analyses included all five currently recognised species of *Syndactyla* (*subalaris, ruficollis, rufosuperciliata, guttulata* and *dimidiata*). Loudsongs of these species (Figs. 2a, 2c, 2e, 2g, 2h; *guttulata* not shown) are remarkably similar in pattern and quality, and consist of a series of nasal or scratchy, chattering notes (1.5–8.5 seconds in duration, delivered at *c*.5–8 kHz) that usually accelerate markedly toward the end and often terminate abruptly. The terminal, more closely spaced notes are usually less nasal or scratchy in quality compared to the introductory and middle song notes, as evidenced by note-width differences. As in *roraimae*, songs of the four *Syndactyla* (only one song of *guttulata* was available, so it was excluded from this part of the analysis) vary greatly in length, and somewhat in frequency shifts and pace changes (acceleration or deceleration within the song), both within and among individuals. These parameters are influenced by playback and the bird's state of agitation. Calls of all five *Syndactyla* species (Figs. 2b, 2d, 2f, 2i) are also remarkably uniform between species, consisting of a harsh, nasal *TCHEK*, *TCHECH* or *TCHAK* (6–8 kHz), and a harsh, generally evenly paced rattle of varying length, delivered at *c*.4–6 kHz (Fig. 2j; *guttulata* is not shown).

Loudsongs of *Simoxenops ucayalae* resemble those of *A. roraimae* and the five *Syndactyla* in being a long series of closely spaced, harsh notes with a distinctly nasal quality (Robbins & Zimmer 2005; Figs. 2g–h). They are lower in frequency (*c*.3–4 kHz) than the loudsongs of *Syndactyla*, but vary similarly in overall song-length (*c*.3–5 seconds), frequency shifts, and pace changes (acceleration and deceleration) between songs from the same individual. As in *roraimae* and the *Syndactyla* species, this variation is influenced by playback and by the degree of agitation of the responding bird. In contrast to the five *Syndactyla*, the loudsongs of *Simoxenops ucayalae* typically accelerate more markedly over the first part of the song and slow toward the end, but still end abruptly. In this respect, they are most similar to loudsongs of *Syndactyla dimidiata*, which often begin with a preamble of closely spaced notes that then slow to the main series of more widely spaced nasal notes. Loudsongs of *S. ucayalae* are also similar to those of *Syndactyla dimidiata* in often beginning with a stuttering start of lower frequency and lower amplitude notes. Our inventory contains only a single recording of *Simoxenops striatus*, precluding generalisations about its vocalisations; however, loudsongs of the single *striatus* example are similar to those of *ucayalae* in pattern and quality. The call of *S. ucayalae* is a harsh, nasal *TCHAK* (Robbins & Zimmer 2005; Fig. 2i), similar to that of *roraimae* and the five *Syndactyla* species surveyed.

In contrast to *Syndactyla* and *Simoxenops*, the seven species of *Automolus* show little internal cohesion in vocal characters, which may indicate that the latter genus is not monophyletic. The loudsongs of *A. infuscatus* and *A. rufipileatus* are slightly descending rattles similar to one another in pace, pitch and note shape, but which differ in length and pattern. The rattle of each species comprises an evenly paced series of rapid similar notes delivered

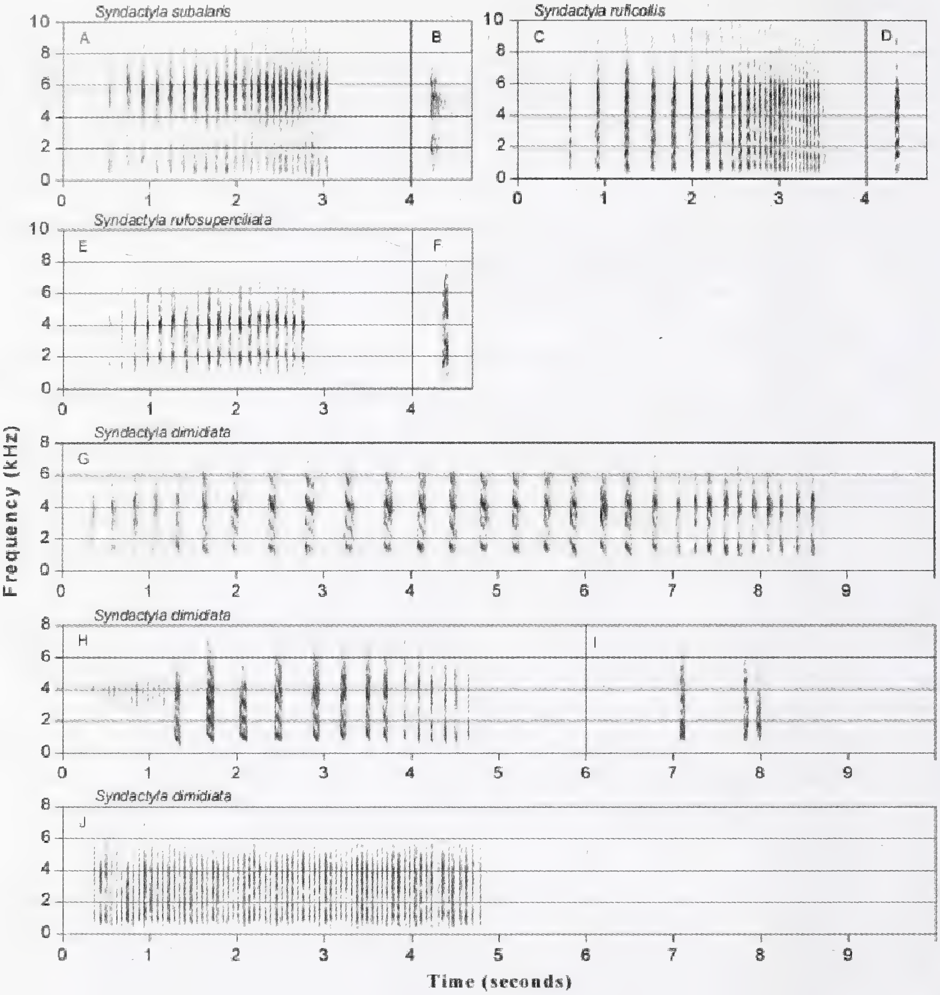

Figure 2. Vocalisations of various species of *Syndactyla* foliage-gleaners. (a) *Syndactyla subularis*: natural song, Monteverde Cloud Forest Reserve, Costa Rica (March 1994). (b) *Syndactyla subularis*: single-note call, Cerro de la Muerte, Costa Rica (March 1997). (c) *Syndactyla ruficollis*: natural song, Abra Porculla, dpto. Piura, Peru (24 January 2001). (d) *Syndactyla ruficollis*: single-note call, Abra Porculla, dpto. Piura, Peru (24 January 2001). (e) *Syndactyla rufosuperciliata*: natural song, Serra do Caraça, Minas Gerais, Brazil (6 September 2001). (f) *Syndactyla rufosuperciliata*: single-note call, Itatiaia National Park, Rio de Janeiro, Brazil (21 October 1998). (g) *Syndactyla dimidiata*: responsorial song of male–female duet, Brasília National Park, Distrito Federal, Brazil (20 August 2002). (h) *Syndactyla dimidiata*: initiating song of male–female duet, Brasília National Park, Distrito Federal, Brazil (20 August 2002). (i) *Syndactyla dimidiata*: call notes, Brasília National Park, Distrito Federal, Brazil (20 August 2002). (j) *Syndactyla dimidiata*: rattle call in response to playback, Patos de Minas, Minas Gerais, Brazil (27 December 1996; A. Whittaker). All recordings by K. J. Zimmer unless otherwise noted. All spectrograms by P. R. Isler.

at a rate too fast for the human ear to clearly distinguish individual notes (Zimmer 2002; Figs. 4, 7). The loudsong of *A. paraensis* is a loud series of 2–17 well-spaced, frequency-modulated notes, each of which has a particularly harsh, grating quality (Zimmer 2002; Fig. 3). The number of notes and the length of songs frequently vary within a song bout from the same individual. Categorisation of *A. ochrolaemus* songs is difficult as a result of the high degree of geographic vocal variation within the complex, the nature of which is the subject of ongoing investigation. However, loudsongs of the four recognised South American subspecies of *ochrolaemus* (*pallidigularis*, *ochrolaemus*, *turdinus* and *auricularis*) are similar to one another in consisting of a descending series of 4–8 countable, nasal notes (but lacking frequency modulation, and thus, any scratchy or harsh quality), often with a low-amplitude, terminal rattle. The loudsongs of *A. rubiginosus* also vary geographically, but all can be categorised as consisting of slowly delivered, two-syllabled or diphthongal nasal notes resembling vocalisations of some *Synallaxis* spinetails (pers. obs.) and totally unlike the loudsongs of any other *Automolus*. The loudsong of *A. melanopezus* is also divergent, consisting of 2–3 well-differentiated, introductory *WHIP* notes, followed by a rapid, uncountable burst of closely spaced notes. The loudsong of *A. leucophthalmus* consists of a barely countable series of 2–12 closely spaced doublets, the individual notes of which are clear in tone and lack frequency modulation (Zimmer 2008; Figs. 3–4). The subspecies *A. leucophthalmus lammi* differs from others in the complex in that the loudsong consists of a countable series of closely spaced, frequency-modulated notes or doublets, each of which has a particularly harsh, grating quality, similar to that of the song notes of *A. paraensis* (Zimmer 2008; Fig. 2). As in *A. paraensis*, all subspecies of *A. leucophthalmus* vary the number of notes and length of songs within an individual song bout.

As is the case with loudsongs, calls of the seven species of *Automolus* differ noticeably from those of *A. roraimae*, *Syndactyla* and *Simoxenops*, and vary markedly within the genus. The most common call of *A. paraensis* is a loud, single-noted *quip* or *queep* with a distinctly liquid quality (Zimmer 2002; Figs. 3e–g). A less frequently given long call is a series of 4–10 *quip* notes that accelerate after the initial note and then slow toward the end (Zimmer 2002; Fig. 3h). The most commonly heard call from *A. infuscatus* is a two-noted *chik-uh* or *chik-it*, in which the first note is higher pitched than the second (Zimmer 2002; Figs. 5a–b, g–h). A sharp, squeaky, single-noted *chik* is also given (Zimmer 2002; Figs. 5c, d, i). All taxa in the *A. leucophthalmus* complex give single-note *kwek* and double-noted *kwek-kwaah* calls (Zimmer 2008; Figs. 2i–j, 3g–i, 4d–e) that are similarly liquid in quality, and possibly homologous to the calls of *A. paraensis* and *A. infuscatus*. *A. leucophthalmus* also has a long call of 8–20, liquid *weck* notes, with or without a differentiated preamble, which varies both geographically and individually (Zimmer 2008; Figs. 2g–h, 3e–f). Calls of *A. ochrolaemus* are difficult to characterise due to geographic variation between subspecies, but most taxa give a harsh, somewhat buzzy single-noted *djurr*, *jraah* or some permutation thereof, which is completely different in quality from the calls of *paraensis*, *infuscatus* and *leucophthalmus*. The typical call of *A. rufipileatus* is a guttural, single-noted *jowp*, closer to the calls of the *A. ochrolaemus* complex, but still quite different. Our relatively small inventories of *A. melanopezus* and *A. rubiginosus* contain only loudsongs, precluding any generalisations concerning their respective calls.

The eight species of *Philydor* surveyed can be divided into three vocal groups based on differences in loudsongs. The first group includes Ochre-breasted Foliage-gleaner *P. lichtensteini* and the various subspecies comprising the Rufous-rumped Foliage-gleaner *P. erythrocercum*. Loudsongs of these species (Robbins & Zimmer 2005; Figs. 3a, 3d) consist of a countable series of distinctly spaced, sharp or squeaky notes. The second group includes Black-capped Foliage-gleaner *P. atricapillus*, Chestnut-winged Foliage-gleaner *P. erythropterus* and Cinnamon-rumped Foliage-gleaner *P. pyrrhodes*. Loudsongs in this group (Robbins & Zimmer 2005; Figs. 3b–c, 3e) consist of a long series of uncountable, closely spaced notes that form a trill. In general, these songs show relatively slight changes in frequency from start to finish, although the song of *P. pyrrhodes* is distinguished by a distinct change in amplitude beginning with the middle third of the song (Robbins & Zimmer 2005; Fig. 3e). The third group includes Buff-fronted Foliage-gleaner *P. rufum*, Rufous-tailed Foliage-gleaner *P. ruficaudatum*, and Slaty-winged Foliage-gleaner *P. fuscipenne*. Loudsongs of these species (Robbins & Zimmer; Fig. 3f) are somewhat intermediate (relative to those of the other two groups) with respect to the number of notes and the spacing. They could be characterised as rattles that change in pace and/or frequency (sometimes several times) over the course of the song, and that have a more 'staccato' or 'ratchet' quality. None of the eight species considered here has a loudsong whose notes could be characterised as imparting (either individually, or in entirety) a 'nasal' or 'scratchy' quality. In marked contrast to *A. roraimae*, the various *Syndactyla* species and *Simoxenops ucayalae*, none of the eight species of *Philydor* showed any tendency for marked intra-population variation in song characters, either within or among individuals. Also in contrast to *A. roraimae*, *Syndactyla* spp., and *Simoxenops ucayalae*, the *Philydor* species did not conspicuously alter the length or patterns of their loudsongs in response to playback. However, in response to playback, *P. pyrrhodes* does regularly give a long, low-amplitude rattle call that is similar to the loudsong but without shifts in amplitude, pace, or frequency (KJZ unpubl.).

Calls of the eight *Philydor* species (excluding *novaesi*) show no unifying threads, and vary considerably between species. Calls from our inventory are as follows: (a) *erythrocercum*—an explosive, somewhat squeaky *SQUEET!* or an ascending, loud *WHEEEK!*; (b) *ruficaudatum*—a thin, brittle rattle *tsissiitt* with the quality of a waxwing (*Bombycilla*); (c) *fuscipenne*—a thin, sharp *cheet* or *steet*, and a short, stacatto *chidideet*; (d) *rufum*—a hard *JIK!*; (e) *atricapillus*—a squealing, loud *SKEW* or *SPREE*, and a loud series of 3–4 ascending whistled *TWEEEET* notes; (f) *lichtensteini*—a thin, abbreviated fast rattle *skit't't'r'r'r'tt*; (g) *erythropterum*—a shrill *KREEEAH* or *KREEER*; (h) *pyrrhodes*—a hard *chidit* or *chikit*, and, in response to playback, a prolonged, low-amplitude rattle (sometimes lasting up to 30 seconds).

Vocalisations of the two *Anabazenops* (Kratter & Parker 1997; Fig. 3) are similar in many respects and, although exhibiting some similarities in pattern, are very different in tonal quality, note shape, pace and frequency from those of *A. roraimae* or *Syndactyla*. The loudsong of *Anabazenops dorsalis* is a series of 5–25 widely spaced clucking notes that start quickly before slowing to an even pace, and which have an overall flat pattern of peak frequency (*c*.1.5–2.5 kHz), but which peak in amplitude mid-song (*kek-kek-kek CLOCK CLOCK CLOCK CLOCK CLOCK CLOCK*). As in *roraimae*, all *Syndactyla* species and *Simoxenops*, *Anabazenops dorsalis* loudsongs are variable within and among individuals, in both the number of notes and in the presence or absence and length of any stuttering preamble. This variation seems, in part, a function of agitation level. Foliage-gleaners in agonistic encounters or ones responding to playback generally give longer songs, and are more likely to include a lower amplitude, chattering preamble to the song. The most commonly heard call of *A. dorsalis* is a single-note *jek*, which is a somewhat harsher version of the introductory notes of the loudsong. Less frequently heard is a long, harsh chatter or rattle of variable length (up to 84 seconds) that resembles a lower amplitude version of the rattle call of a Ringed Kingfisher *Megaceryle torquata*. This call is most frequently given in agonistic encounters with conspecifics or following playback. A shortened and more stuttering version of this call is often given as the chattering prelude to the loudsong. The loudsong of *Anabazenops fuscus* is a similar but somewhat faster paced series of 4–30+ countable, evenly paced *jeck* notes (*c*.2.0–3.0 kHz), which may or may not be preceded by a lower amplitude, chattering preamble. The chatter call of *A. fuscus* can vary in length, but never reaches the extremes of >60 seconds of *A. dorsalis*. As in *A. dorsalis*, there is much inter- and intra-individual variation in the songs of *A. fuscus*, primarily pertaining to the length of the song and the presence or absence of the chattering preamble. Other calls of *A. fuscus* include a harsh, single-note *jeck*, similar to the individual notes of the song, and an arresting series of 2–7, loud, squealing notes. Mated pairs of both *Anabazenops* commonly engage in antiphonal duets, which are variable in nature. These often involve one member of the pair giving a typical loudsong, while the other gives a sustained chatter or rattle call.

Syringeal morphology.—The *A. roraimae* syrinx is a typical tracheophone syrinx, with B and the first two A elements divided. Two narrow flat bars (*Processi vocales*) are fused posteriorly by elastic connective tissue to the lateral surfaces of the A-1 and A-2 elements (Figs. 3a–b). In lateral view this structure is broader caudally, thinner cranially, but 'rounded' in shape (Fig. 3b). The *Membranae tracheales* begin at the A-3 element, which is complete. This membrane has 6–7 crossbars that are A elements, none of which is exceptionally thin (within the *Membranae* each element is about one-fifth the width of the unmodified A-element). This structure is limited caudally by A-3, and the cranial limit is A-10 or A-11, so it consists of 7–8 small membranes. All elements within the limits of the *Membranae tracheales* cross it dorsally and ventrally (Fig. 3a). At the end of the *Membranae tracheales* there is a cylinder composed of two complete, partially fused A-elements forming a drum ('Dr' in Fig. 3).

The extrinsic muscle *M. tracheolateralis* inserts immediately cranial to the drum, whereas *M. sternotrachealis* inserts directly on the cranial end of the *Processus vocalis*. The intrinsic muscle pair *M. vocalis dorsalis* originates on the lateral and dorsolateral cranial edge of the drum, and the *M. vocalis ventralis* muscle pair originates on the lateral and ventrilateral surfaces of the same elements. These muscles insert on the dorsal or ventral caudal portion of the *Processus vocalis*, respectively (see characters 19 and 20, Appendix 3, for more details).

In lateral views of other *Automolus* syringes analysed, the caudal portion of the *Processus vocalis* is much wider than the cranial extreme, which is in all cases more acute than in *A. roraimae* (Fig. 4a, c, e, g, i and k; character 12, Appendix 3, especially so in some cases, like *A. infuscatus*, Fig. 4a). In *Automolus* species, when syringes are viewed ventrally (Fig. 4b, d, f, h, j and 1), the crossbars are thinner, being almost absent in *A. rubiginosus* (Fig. 4h, character 9, Appendix 3). The drums are thicker, with more elements that are more strongly fused (characters 15–14, Appendix 3, respectively). Although Raposo *et al.* (2006) found that the extent of element fusion within Dendrocolaptinae syringes is intraspecifically variable, we found no variation among three *roraimae* syringes examined.

The *Philydor* syringes (Fig. 5a–j) also have a *Processus vocalis* with an acute cranial extreme, except in *P. lichtensteini*. On the other hand, *P. pyrrhodes*, *P. erythrocercum* and *P. lichtensteini* have a pair of 'horns' on the ventral side of this structure (character 11, Appendix 3). This is particularly interesting because 'horns' in the *Processi vocales* were only known on both the ventral and dorsal sides of *Geositta* and dendrocolaptid species; indeed, this character was considered a Dendrocolaptinae synapomorph. The significance of this finding is the subject of an ongoing investigation by CK. The drum is strong and completely fused in *P. atricapillus*, *P. erythrocercum* and *P. pyrrhodes*, but there is no drum in *P. rufum* and *P. lichtensteini* (see character 14, Appendix 3). Although the number and extent of element fusion that comprise the drum may vary intraspecifically, it nonetheless is possible to identify the same extent of drum strength among individuals of the same species. The crossbars in the *Membranae tracheales* are very thin, especially in *P. rufum*.

Of *Syndactyla* syringes analysed, *dimidiata* (Figs. 5k–1, 6c–d), *subalaris* (Fig. 6g–h) and *rufosuperciliata* (Fig. 6a–b) had characteristics very similar to those of *A. roraimae*, with the *Processus vocalis* lacking an acute cranial extreme, having a 'rounded' shape in lateral view, and a drum with only two fused or semi-fused elements (=no well-developed drum) and *Membranae tracheales* with well-developed (not extremely thin) crossbars. Except for the lateral view of *Processus vocalis* of *A. leucophthalmus* (Fig. 4i), which is similar to that of

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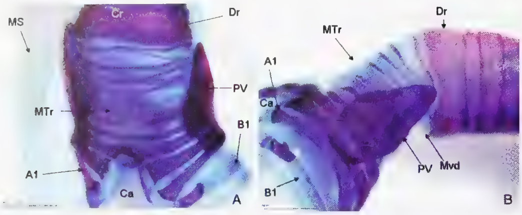
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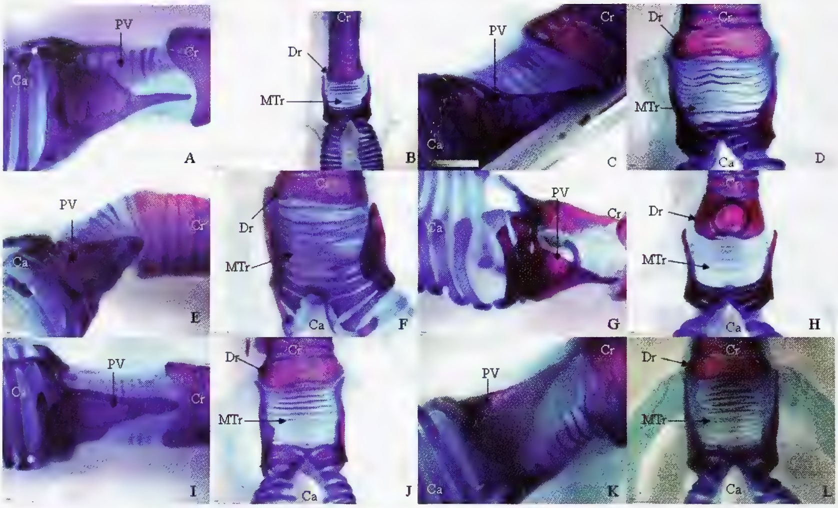
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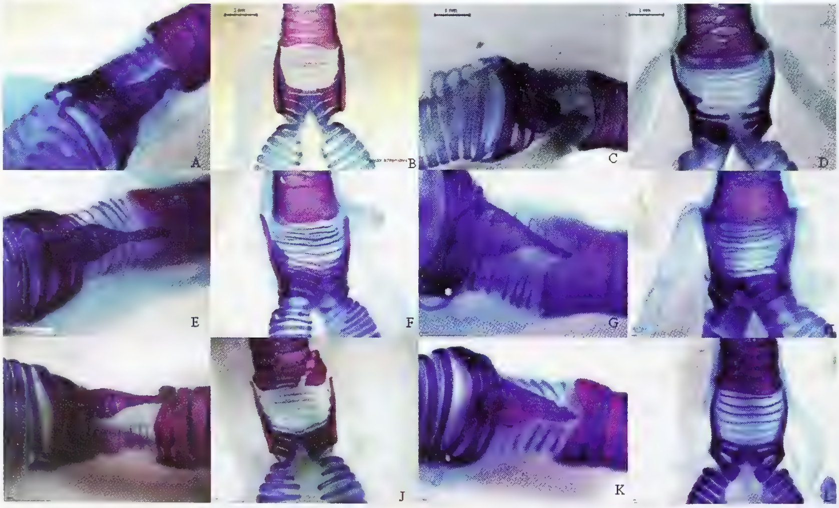
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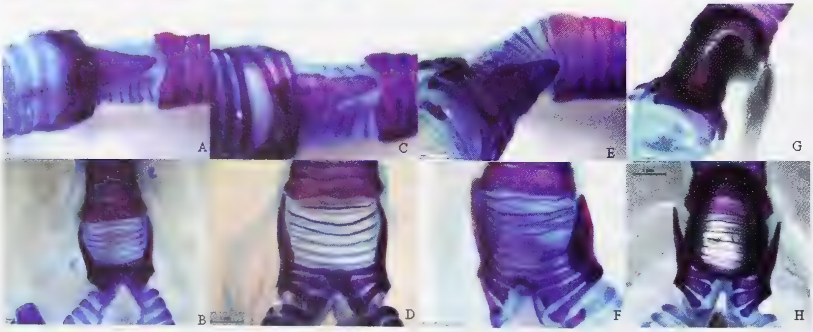
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Syndactyla dimidiata (Fig. 5k), these characteristics are not found in other *Automolus* and *Philydor* examined.

Characteristics of syringeal extrinsic and intrinsic muscles (*M. tracheolateralis, M. sternotrachealis*, and *M. vocalis ventralis* and *dorsalis*), were the same in *A. roraimae* and all other species analysed (see characters 17, 18, 21 and 22, Appendix 3), except for the caudal insertion of the intrinsic muscles (characters 19 and 20, Appendix 3).

Behaviour.—In the Sierra de Lema (Bolívar, Venezuela) and on the north slope of Mt. Roraima, Guyana, individuals or presumed pairs of *A. roraimae* occupied stunted, melastome-dominated, mossy forest, where they were most frequently seen at the edge of disturbed areas in a large matrix of pristine forest. Individuals were encountered more often than pairs, members of which foraged mostly in fairly close association with their presumed mates, maintaining contact through regular vocalisations. At Sierra de Lema, *roraimae* regularly associated with mixed-species flocks of other insectivores, but was nearly as often found away from such flocks. In contrast, during late March–early April 2001 on Mt. Roraima, birds were breeding and were not associated with mixed-species flocks. Specimen data from two females indicate that they had just laid eggs on 29 March and 5 April (KUMNH 93464–5). When associated with mixed-species flocks, individual foliage-gleaners exhibited a particular tendency to stay close to pairs of Streak-backed Antshrikes *Thamnophilus insignis*, following closely behind the antshrikes whenever they moved any significant distance. *A. roraimae* foraged *c*.0.5–9.0 m above ground, but primarily at 1–6 m, and often so low to the ground that their movements were obscured by dense vegetation. Progression was through a rapid series of short hops, or 'hitching', from side to side, in which the orientation of the body was changed relative to the position of the substrate, from one hop to the next. Much foraging was vertically directed along the main trunks of small trees and slender saplings, but individuals also moved in a lateral path along more open limbs and through vine tangles. Foliage-gleaners frequently wrapped their tails around slender trunks or branches as a sort of brace, particularly when moving vertically. Foraging birds regularly flicked both wings simultaneously, a movement that was usually accompanied by a simultaneous shallow vertical flick of the tail. Arthropod prey was mostly perch-gleaned from branch or vine surfaces by reaching, followed by a quick stab of

Captions to plates on opposite page:

Figure 3. Alizarine Red and Alcian Blue cleared and stained *Automolus roraimae* syrinx. (a) ventral view. (b) lateral view. References: A1: ring A1, B1: ring B1, Ca: Caudal part of the syrinx, Cr: Cranial part of the syrinx, Dr: Drum, MS: *Sternotrachealis* muscle, MTr: *Membrana trachealis*, Mvd: *Vocalis dorsalis* muscle, PV: *Processus vocalis*.

Figure 4. Alizarine Red and Alcian Blue cleared and stained syrinx of (a) *Automolus infuscatus* lateral view. (b) *A. infuscatus* ventral view. (c) *Automolus ochrolaemus* lateral view. (d) *A. ochrolaemus* ventral view. (e) *Automolus roraimae* lateral view. (f) *A. roraimae* ventral view. (g) *Automolus rubiginosus* lateral view. (h) *A. rubiginosus* ventral view. (i) *Automolus leucophthalmus* lateral view. (j) *A. leucophthalmus* ventral view. (k) *Automolus rufipileatus* lateral view. (1) *A. rufipileatus* ventral view. References: Ca: Caudal part of the syrinx, Cr: Cranial part of the syrinx, PV: *Processus vocalis*, MTr: *Membranae tracheales*, Dr: Drum.

Figure 5. Alizarine Red and Alcian Blue cleared and stained syrinx of (a) *Philydor lichtensteini* lateral view. (b) *P. lichtensteini* ventral view. (c) *Philydor erythrocercum* lateral view. (d) *P. erythrocercum* ventral view. (e) *Philydor atricapillus* lateral view. (f) *P. atricapillus* ventral view. (g) *Philydor pyrrhodes* lateral view. (h) *P. pyrrhodes* ventral view. (i) *Philydor rufum* lateral view. (j) *P. rufum* ventral view. (k) *Syndactyla dimidiata* lateral view. (1) *S. dimidiata* dorsal view.

Figure 6. Alizarine Red and Alcian Blue cleared and stained syrinx of (a) *Syndactyla rufosuperciliata* lateral view. (b) *S. rufosuperciliata* ventral view. (c) *Syndactyla dimidiata* lateral view. (d) *S. dimidiata* ventral view. (e) *Automolus roraimae* lateral view. (f) *A. roraimae* ventral view. (g) *Syndactyla subalaris* lateral view. (h) *S. subalaris* ventral view.

the bill. Acrobatic manoeuvres, such as hanging, were regularly employed, and on several occasions birds used their bill to hammer at nodes of branches, stems or dead leaves, frequently probing into moss on trunks or arboreal leaf litter suspended in vines. KJZ videotaped one individual that clung to a hanging dead branch while hammering and probing in the fractured end with its bill, much in the manner of a *Xenops*. Singing birds assumed a fairly upright (*c*.60–70°) position, usually on a more open branch. The tail was vibrated to the rhythm of the song, and the throat feathers were distinctly ruffled.

Discussion

The generic relationships of the many foliage-gleaners comprising the Philydorinae have long been disputed. Vaurie (1980) employed an expanded concept of the genus *Philydor* that included, among many others, the currently recognised genera *Syndactyla* and *Simoxenops*. Although Vaurie's views failed to gain wide acceptance, the generic placement of some foliage-gleaners has shifted among *Automolus*, *Philydor* and *Syndactyla*, suggesting that the plumage characters currently used to separate these genera are not well defined. The taxon *Syndactyla mirandae* was described from Goiás, Brazil, and for a time was treated as a subspecies of Buff-browed Foliage-gleaner *S. rufosuperciliata*, before it was determined to be synonym of *P. dimidiatum* (Remsen 2003). *P. dimidiatum*, in turn, was subsequently transferred to *Syndactyla* (Robbins & Zimmer 2005) as was Rufous-necked Foliage-gleaner *Automolus ruficollis* (Parker *et al*. 1985, Ridgely & Tudor 1994).

The presence or absence of streaking on either the upper- or underparts has traditionally been treated as a major plumage distinction within the Philydorinae (e.g. Vaurie 1980). Within the currently recognised *Syndactyla*, the trans-Andean *ruficollis* and *dimidiata* of south-central Brazil and east-central Paraguay are most divergent from the others in being largely unstreaked (Robbins & Zimmer 2005). The emphasis in earlier classifications on the presence or absence of streaking accounts for the placement of *ruficollis* and *dimidiata* in *Automolus* and *Philydor*, respectively. With the recent generic transfer of these species, *Syndactyla*, as currently constituted, now comprises a gradient of species, from heavily streaked on both dorsal and ventral surfaces (*subalaris*, *guttulata*), to heavily streaked only on the ventral surface (*rufosuperciliata*), to strongly flammulated ventrally (*ruficollis*), to only vaguely flammulated below (*dimidiata*). In an earlier paper (Robbins & Zimmer 2005), we recommended that the genus *Simoxenops* be subsumed into *Syndactyla*, and pointed out that the inclusion of (then) *Philydor dimidiatum* in *Syndactyla* bridged the perceived plumage morphological gap between *Syndactyla* and *Simoxenops*.

The ongoing debate as to whether *A. roraimae* belongs in *Automolus* or *Philydor* has been similarly based almost entirely on the perceived importance of plumage characters. Historically, there has been little or no discussion of the possibility that *roraimae* is a *Syndactyla*, primarily because *roraimae* is unstreaked, and prior to 1985, all species included in *Syndactyla* were boldly streaked. In addition to lacking streaking, *roraimae* has a striking white or cream-coloured throat that contrasts strongly with the darker underparts, and a bold white supercilium that contrasts strongly with the dark ear-coverts. In these characters, and in its overall plumage pattern, *roraimae* bears a striking resemblance to *Anabazenops dorsalis*, a species previously placed in *Automolus* based on plumage similarities to *Automolus infuscatus*, but since transferred to *Anabazenops* largely on the basis of vocal and ecological characters (Kratter & Parker 1997). Vaurie (1980: 293) used the shared characters of uniformly coloured upperparts (excluding the tail and rump), pale whitish throat and absence of streaking to suggest a possible close relationship between *A. infuscatus*, *A. leucophthalmus* and *Anabazenops dorsalis*, inexplicably excluding *A. roraimae* (which shares all of the same characters) from the discussion. In his key to *Automolus*, Vaurie (1980: 298) further noted that *A. albigularis* (=*roraimae*) and *dorsalis* also share a distinctly well-defined whitish supercilium and postocular streak.

Despite the striking similarity in plumage pattern of *roraimae* to these other species, it is increasingly apparent that such plumage similarities do not reflect phylogenetic relationships. Dusky-cheeked Foliage-gleaner *Anabazenops dorsalis* has been shown to belong in *Anabazenops* despite its plumage similarities to *Automolus infuscatus*, and all plumage characters used by Vaurie (1980) to unite those species can also be found in *Philydor erythrocercum*. Indeed, until recently (Dickerman *et al.* 1986) the emphasis on plumage characters in elucidating relationships among the foliage-gleaners had resulted in the classification of the juvenile of *roraimae* as a distinct species in a separate genus from the adult! The use of alternative plumage characters could lead to a completely different interpretation of generic relationships. The *roraimae* juvenile plumage differs from that of adults in having the supercilium and the underparts tinged rich ochraceous-buff, and in having dusky fringes to many of the breast feathers (Dickerman *et al.* 1986, Hilty 2003, Remsen 2003), a juvenile vs. adult plumage distinction which parallels that found in *Syndactyla subalaris* (Vaurie 1980, Remsen 2003), but which is without parallel in any species of *Automolus* (Kratter & Parker 1997, Remsen 2003). Unlike *roraimae*, none of the nine currently recognised species of *Philydor* has a well-defined white throat that contrasts strongly with much darker underparts, nor does any species of *Philydor* or *Automolus* possess a bold white supercilium and postocular streak. Conversely, two species of *Syndactyla*, *subalaris* and *guttulata*, are similar to *roraimae* in having a distinct pale supercilium and dark underparts that contrast strongly with a well-delineated pale (whitish or pale buff) throat, the principal difference being that those species are also boldly streaked above and below. In having a distinctly white throat and supercilium, *roraimae* most closely approaches *Anabazenops* (*dorsalis* and *fuscus*), but neither of these has sharply delineated, contrasting dark underparts, and *fuscus* has a bold, white hindcollar.

Other morphological characters are more suggestive of a close relationship between *A. roraimae* and *Syndactyla*. Like all *Syndactyla*, and both species of *Simoxenops*, *A. roraimae* has an upturned mandible, or 'ascending gonys' (Vaurie 1980, Remsen 2003), although the angle is not nearly as pronounced as in *Simoxenops*. Kratter & Parker (1997) presented morphometric data for 18 species of foliage-gleaners, including *roraimae,* three other species currently included in *Automolus* (*infuscatus*, *melanopezus* and *ochrolaemus*), and *Syndactyla rufosuperciliata*. In bill-length, bill-width, bill-depth and wing-chord, *roraimae* was distinctly smaller than the other three species of *Automolus*, but nearly identical to *S. rufosuperciliata*.

Additionally, syringeal morphology, which has been considered an important higher taxonomic character in suboscines, including Furnariidae (Müller 1878, Ames 1971, Remsen 2003) supports a relationship between *roraimae* and *Syndactyla*, whilst showing *roraimae* to be distinct from both *Automolus* and *Philydor* in *Processus vocalis* shape in lateral view, drum strength, and width of elements crossing the *Membranae tracheales.*

Excluding *A. roraimae*, *Automolus* and *Philydor* species examined had syringes in which the *Processi vocales* had an acute proximal extreme (except *A. leucophthalmus*) and a stronger drum consisting of more fused elements, as well as a *Membrana trachealis* in which the crossbars were extremely narrow or nearly lacking. In each of these characters, syringes of both *roraimae* and *S. dimidiata* more resembled those of the *Syndactyla* species examined (Fig. 6), thereby adding support for the inclusion of these two species within *Syndactyla*. Unfortunately, *Simoxenops* syringeal material was not available.

Because of the inherited nature of vocalisations within the suboscines (Lanyon 1978, Kroodsma 1984, Kroodsma 1989), vocalisations are often a strong indication of relationships within this group. Within the Furnariidae, vocalisations in concert with morphological and behavioral aspects have been used to elucidate relationships at the species and generic levels (Parker *et al.* 1985, Whitney & Pacheco 1994, Kratter & Parker 1997, Zimmer 1997, Remsen 2003, Robbins & Zimmer 2005). Indeed, Vaurie's (1971, 1980) systematic revisions of this family, which did not include vocal information, but were based primarily on plumage and external structural characters, led to conclusions that have not been generally accepted by the ornithological community (Fitzpatrick 1982, Sibley & Monroe 1990, Ridgely & Tudor 1994, Remsen 2003).

Vocal characters may provide the strongest argument for the relatedness of *roraimae* to *Syndactyla*. Loudsongs of the five *Syndactyla* species represented in our inventory were remarkably uniform in pattern and note quality. Calls of these species were also strikingly similar to one another. Indeed, vocalisations of all five are so similar that they are easily confused by the uninitiated listener. All are united by the harsh, nasal quality of their notes in both loudsongs and in calls, the accelerating pattern of the loudsong, the often stuttering start to the loudsong, and the variation in loudsong length, changes of pace, and frequency shifts displayed by individuals, particularly in response to playback.

The vocalisations of *A. roraimae* are strikingly similar to those of *Syndactyla*, and are not similar to those of any of the other recognised species of *Automolus*, *Philydor* or *Anabazenops*, none of which shares the distinctive nasal, scratchy quality that immediately distinguishes *roraimae*, *Syndactyla* and *Simoxenops*. Vocal similarities between *Simoxenops* and *Syndactyla* were first noted by Parker (1982), and have been amplified by subsequent authors (Parker & Bates 1992, Ridgely & Tudor 1994, Remsen 2003, Robbins & Zimmer 2005).

Willard *et al.* (1991) described the foraging behaviour of *roraimae* as primarily by 'probing in medium to large arboreal bromeliads', Kratter & Parker (1997) reported searches of clasping sheaths around bamboo nodes, and Hilty (2003) noted it probing in dead palm fronds. Behaviourally, *roraimae* is also a closer fit with *Syndactyla* in gleaning primarily from branch or vine surfaces, employing hammering or chiseling motions of the bill, in hitching up vertical trunks, and in often foraging apart from mixed-species flocks. The hammering or chiseling of substrates has been noted for *S. guttulata* (Hilty 2003), *S. rufosuperciliata* (Remsen 2003), *S. dimidiata* (Robbins & Zimmer 2005) and *S. ruficollis* (pers. obs.), and is a primary search manoeuvre of both *Simoxenops* (Parker 1982, Parker & Bates 1992, Zimmer *et al.* 1997, Remsen 2003). Conversely, this behaviour is rare or absent among species of *Automolus* and *Philydor*, most of which are dead-leaf specialists (Remsen 2003). One study, conducted in south-east Peru, showed that 88–100% of all search manoeuvres by each of four species of *Automolus* (*infuscatus*, *ochrolaemus*, *melanopezus* and *rufipileatus*) were directed to dead leaves. Less rigorously quantified observations of the foraging behaviour of *A. paraensis* and *A. leucophthalmus* from Brazil (Zimmer 2002, 2008) suggested that those two species directed more than 75% of their search manoeuvres to dead leaves as well. Although *roraimae* frequently inspects arboreal leaf-litter, such manoeuvres do not, in our experience, constitute an obvious majority of all foraging manoeuvres, nor is any such specialisation indicated in the scant literature (Willard *et al.* 1991, Hilty 2003, Remsen 2003). B. M. Whitney is cited (Kratter & Parker 1997) as having described the foraging behaviour of *roraimae* as being similar to that of *Syndactyla*, but without further elaboration. Although all *Syndactyla* species regularly associate with mixed-species flocks, they are less habitual in their attendance than are the species of *Philydor*, most of which are inveterate members of such flocks, and rarely encountered away from them (pers. obs.; Remsen 2003). Unlike the two species of *Anabazenops* (Kratter & Parker 1997), *roraimae* does not show any strong specialisation on bamboo.

In vocal characters, syringeal morphology, morphometrics and foraging behaviour, *roraimae* is much more like currently recognised species of *Syndactyla* than currently recognised species of *Automolus* or *Philydor*. It is somewhat divergent from *Syndactyla* with respect to its adult plumage pattern (although more similar in its juvenile plumage), which more closely resembles some *Automolus* and *Anabazenops*. Based on all other characters, these plumage similarities appear convergent and not reflective of relationship.

Taxonomic recommendation

We recommend that *'Automolus' roraimae* be placed in the genus *Syndactyla*; the name would thus become *Syndactyla roraimae* (Hellmayr). Because the adult plumage pattern of *roraimae* is unique among *Syndactyla*, whereas the vocalisations of all species in the genus are similar, it is difficult to identify its sister. Accordingly, we suggest that in a linear sequence, *roraimae* be placed at the beginning of the *Syndactyla*, reflecting its plumage uniqueness. At the same time, we acknowledge that a molecular-based analysis is required to recover phylogenetic relationships within the genus.

Hellmayr (1925) coined the English name of White-throated Automolus for *A. roraimae* and White-throated Foliage-gleaner has been used by most subsequent authors (e.g., Meyer de Schauensee 1970, Ridgely & Tudor 1994, Remsen 2003). Although not inaccurate, the modifier 'White-throated' could just as readily describe *A. leucophthalmus*, *A. infuscatus*, *A. paraensis* and *A. ochrolaemus pallidigularis*, as well as *Anabazenops fuscus* and *A. dorsalis*. Hilty (2003) used the English name of Tepui Foliage-gleaner for *A. roraimae.* Given that *roraimae* is a restricted-range species endemic to the Tepui Endemic Bird Area (Stattersfield *et al.* 1998, Remsen 2003), and that within this region it is found only in montane evergreen forest, primarily on the slopes and tops of tepuis, the name Tepui Foliage-gleaner is not only appropriate but is also more informative. We therefore recommend adopting the English name of Tepui Foliage-gleaner for *Syndactyla roraimae*.

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APPENDIX 1

Recording locations and recordists. Numbers following each name represent the number of individual birds recorded by the recordist at each site.

Automolus roraimae.—GUYANA: Mt. Roraima (M. B. Robbins, 4; MLNS 130494–7). VENEZUELA: Sierra de Lema, Bolívar (S. L. Hilty, 1; K. J. Zimmer, 4).

Automolus ochrolaemus.—BRAZIL: Alta Floresta region, Mato Grosso (K. J. Zimmer, 6); Borba region, Amazonas (K. J. Zimmer, 4); Lábrea region, Amazonas (K. J. Zimmer, 1); Manaus region, Amazonas (K. J. Zimmer, 2); Maués, Amazonas (K. J. Zimmer, 1); Rio Roosevelt, Amazonas (K. J. Zimmer, 1). COSTA RICA: Arenal (K. J. Zimmer, 2); Braulio Carrillo National Park (K. J. Zimmer, 9); Las Cruces OTS Station (K. J. Zimmer, 13); La Selva OTS Station (K. J. Zimmer, 1); Río Sierpe (K. J. Zimmer, 2). ECUADOR: Tiputini Biodiversity Center, Napo (K. J. Zimmer, 3). PANAMA: Nusagandi (K. J. Zimmer, 7). PERU: Hacienda Amazonia, dpto. Madre de Dios (K. J. Zimmer, 2); Manu Wildlife Center, dpto. Madre de Dios (K. J. Zimmer, 4); Tambopata Research Center, dpto. Madre de Dios (K. J. Zimmer, 2). VENEZUELA: Alechiven Camp, Amazonas (K. J. Zimmer, 4); Escalera Road, Bolívar (K. J. Zimmer, 4); Hato Las Nieves, Bolívar (K. J. Zimmer, 2); Junglaven Camp, Amazonas (K. J. Zimmer, 3).

Automolus infuscatus.—BOLIVIA: Suarez, Pando (T. A. Parker, 1). BRAZIL: Lábrea region, Amazonas (K. J. Zimmer, 1); left bank of rio Negro, north of Manaus, Amazonas (M. Cohn-Haft, 1; A. Whittaker, 1); Palmari Lodge, rio Javari, Amazonas (K. J. Zimmer, 5); Porongaba, Acre (A. Whittaker, 2); São Gabriel da Cachoeira, Amazonas (K. J. Zimmer, 3); Serra do Navio, Amapá (K. J. Zimmer, 1). ECUADOR: La Selva Lodge, Napo (R. A. Behrstock, 2; G. H. Rosenberg, 1); Santiago, Morona-Santiago (M. B. Robbins, 3; MLNS 49248, 49284, 77244); Tiputini Biodiversity Center, Napo (K. J. Zimmer, 15). GUYANA: Iwokrama Reserve (R. S. Ridgely, 1; M. B. Robbins, 1; MLNS 125886); Waruma River (M. B. Robbins, 3; MLNS 85740, 85755, 85760); Baramita (M. B. Robbins, 1; MLNS 125887). PERU: south bank of río Napo, 80 km north of Iquitos, dpto. Loreto (T. A. Parker, 2; G. H. Rosenberg, 1); Quebrada Sucusari, dpto. Loreto (T. A. Parker, 6); Yanamono, dpto. Loreto (G. H. Rosenberg, 2); Cocha Cashu, Manu National Park, dpto. Madre de Dios (T. A. Parker, 1); Tambopata Reserve, dpto. Madre de Dios (M. L Isler, 1; L. Kibler, 3; M. Palmer, 2; T. A. Parker, 16; G. H. Rosenberg, 1; A. van den Berg, 4; K. J. Zimmer, 1)

Automolus paraensis.—BRAZIL: Alta Floresta region, Mato Grosso (K. J. Zimmer, 20); Borba region, Amazonas (K. J. Zimmer, 2); Caxiuanã Forest Reserve, Pará (K. J. Zimmer, 11); Rio Roosevelt, Amazonas (K. J. Zimmer, 1); Serra dos Carajás, Pará (K. J. Zimmer, 5).

Automolus leucophthalmus.—BRAZIL: Augusto Ruschi Reserve, Espírito Santo (K. J. Zimmer, 4); Boa Nova, Bahia (A. Whittaker, 1); Caetés, Espírito Santo (K. J. Zimmer, 2); Crasto Reserve, Sergipe (K. J. Zimmer, 9); Fazenda Palmeiras, Bahia (K. J. Zimmer, 12); Iguaçu National Park, Paraná (K. J. Zimmer, 33); Itabeguara, Alagaos (K. J. Zimmer, 1); Linhares CVRD Reserve, Espírito Santo (K. J. Zimmer, 3); Murici Reserve, Alagaos (K. J. Zimmer, 5; C. A. Marantz, 3); Porto Seguro, Bahia (K. J. Zimmer, 2); Santa Teresa, Espírito Santo (K. J. Zimmer, 4); Serra do Caraça Natural Reserve, Minas Gerais (K. J. Zimmer, 2); Sooretama Biological Reserve, Espírito Santo (K. J. Zimmer, 1); Ubatuba, São Paulo (K. J. Zimmer, 17); Una Ecological Park, Bahia (K. J. Zimmer, 2); Volta Velha Reserve, Santa Catarina (K. J. Zimmer, 2)

Automolus melanopezus.—ECUADOR: Tiputini Biodiversity Center, Napo (K. J. Zimmer, 3). PERU: Tambopata Research Center, dpto. Madre de Dios (K. J. Zimmer, 4).

Automolus rubiginosus.—COSTA RICA: Las Cruces OTS Station (K. J. Zimmer, 4). ECUADOR: Tinalandia, Pichincha (K. J. Zimmer, 1); Tiputini Biodiversity Center, Napo (K. J. Zimmer, 2). VENEZUELA: Santa Elena, Bolívar (K. J. Zimmer, 1).

Automolus rufipileatus.—BRAZIL: Alta Floresta region, Mato Grosso (K. J. Zimmer, 19); Boa Vista, Roraima (K. J. Zimmer, 1); Fazenda Rancho Grande, Rondônia (K. J. Zimmer, 1); Rio Roosevelt, Amazonas (K. J. Zimmer, 1); São Gabriel da Cachoeira, Amazonas (K. J. Zimmer, 1); Serra dos Carajás, Pará (K. J. Zimmer, 6). PERU: Hacienda Amazonia, dpto. Cusco (K. J. Zimmer, 1); Manu Wildlife Center, dpto. Madre de Dios (K. J. Zimmer, 5); Tambopata Research Center, dpto. Madre de Dios (K. J. Zimmer, 3). VENEZUELA: Rio Caura, Bolívar (K. J. Zimmer, 1).

Philydor ruficaudatum.—BRAZIL: Serra dos Carajás, Pará (K. J. Zimmer, 5); Alta Floresta, Mato Grosso (K. J. Zimmer, 2).

Philydor erythrocercum.—BRAZIL: Caxiuanã Forest Reserve, Pará (K. J. Zimmer, 3); Fazenda Rancho Grande, Rondônia (K. J. Zimmer, 1); Alta Floresta region, Mato Grosso (K. J. Zimmer, 5); Lábrea region, Amazonas (K. J. Zimmer, 2); Maués, Amazonas (K. J. Zimmer, 1); Rio Mapiá, Borba region, Amazonas (K. J. Zimmer, 1); Rio Roosevelt, Amazonas (K. J. Zimmer, 5); Serra dos Carajás, Pará (K. J. Zimmer, 3); Tupana Lodge, Amazonas (K. J. Zimmer, 1). ECUADOR: Tiputini Biodiversity Station, Napo (K. J. Zimmer, 1).

Philydor erythropterum.—BRAZIL: Alta Floresta, Mato Grosso (K. J. Zimmer, 1); Fazenda Rancho Grande, Rondônia (K. J. Zimmer, 4); Lábrea region, Amazonas (K. J. Zimmer, 1); Rio Roosevelt, Amazonas (K. J. Zimmer, 2); Tupana Lodge, Amazonas (K. J. Zimmer, 1). ECUADOR: Tiputini Biodiversity Station, Napo (K. J. Zimmer, 4). PERU: Manu Wildlife Center, dpto. Madre de Dios (K. J. Zimmer, 2).

Philydor lichtensteini.—BRAZIL: Iguaçu National Park, Paraná (K. J. Zimmer, 25); Volta Velha Reserve, Santa Catarina (K. J. Zimmer, 3). PARAGUAY: dptos. Caazapá and Concepción (M. B. Robbins, 7; MLNS 120472–7).

Philydor atricapillus.—BRAZIL: Augusto Ruschi Reserve, Espírito Santo (K. J. Zimmer, 1); Fazenda Palmeiras, Bahia (K. J. Zimmer, 1); Garuva, Paraná (K. J. Zimmer, 1); Iguaçu National Park, Paraná (K. J. Zimmer, 6); Perequê, Rio de Janeiro (K. J. Zimmer, 1); Ubatuba region, São Paulo (K. J. Zimmer, 5); Una Ecological Park, Bahia (K. J. Zimmer, 1); Volta Velha Reserve, Santa Catarina (K. J. Zimmer, 3). PARAGUAY: dpto. Caazapá (M. B. Robbins; MLNS 120471).

Philydor rufum.—BRAZIL: Itatiaia National Park, Rio de Janeiro (K. J. Zimmer, 14); Augusto Ruschi Reserve, Espírito Santo (K. J. Zimmer, 1), Caetés, Espírito Santo (K. J. Zimmer, 3). PERU: Manu Wildlife Center, dpto. Madre de Dios (K. J. Zimmer, 1); Tambopata Research Center, dpto. Madre de Dios (K. J. Zimmer, 1). VENEZUELA: Henri Pittier National Park (K. J. Zimmer, 1)

Philydor pyrrhodes.—BRAZIL: Alta Floresta region, Mato Grosso (K. J. Zimmer, 1). GUYANA: Acari Mts., Rupununi, Barima River (M. B. Robbins, 3; MLNS 120478–80). PERU: Tambopata Research Center, dpto. Madre de Dios (K. J. Zimmer, 1). VENEZUELA: Yapacana National Park, Amazonas (K. J. Zimmer, 1).

Anabazenops dorsalis.—BRAZIL: Alta Floresta region, Mato Grosso (K. J. Zimmer, 20). PERU: Manu Wildlife Center, dpto. Madre de Dios (K. J. Zimmer, 2); Tambopata Research Center, dpto. Madre de Dios (K. J. Zimmer, 6).

Anabazenops fuscus.—BRAZIL: Boa Nova, Bahia (K. J. Zimmer, 1); Itatiaia National Park, Rio de Janeiro (K. J. Zimmer, 32); Santa Teresa region, Espírito Santo (K. J. Zimmer, 5).

Syndactyla subalaris.—COSTA RICA: Cerro de la Muerte (K. J. Zimmer, 1); Monteverde Cloud Forest Reserve (K. J. Zimmer, 12); Tapanti Faunal Reserve (K. J. Zimmer, 1). ECUADOR: Morona-Santiago (M. B. Robbins, 2; MLNS 41285 and 41287). PANAMA: Chiriquí (M. B. Robbins, 2; MLNS 120481–2; K. J. Zimmer, 2). PERU: Abra Patricia, dpto. San Martín (K. J. Zimmer, 2).

Syndactyla rufosuperciliata.—BRAZIL: Itatiaia National Park, Rio de Janeiro (K. J. Zimmer, 17); Espírito Santo (K. J. Zimmer, 2); São Francisco de Paula region, Rio Grande do Sul (K. J. Zimmer, 13); Serra do Caraça, Minas Gerais (K. J. Zimmer, 4); Serra da Graciosa, Paraná (K. J. Zimmer, 1). PARAGUAY: dpto. Caazapá (M. B. Robbins, MLNS 120483). PERU: Cosñipata Road, dpto. Cusco (K. J. Zimmer, 2).

Syndactyla guttulata.—VENEZUELA: Palmichal, Carabobo (P. Boesman, 1).

Syndactyla ruficollis.—ECUADOR: Loja (M. B. Robbins MLNS 57080). PERU: Abra Porculla, dpto. Piura (K. J. Zimmer, 6); Tumbes Reserved Zone, dpto. Tumbes (K. J. Zimmer, 1).

Syndactyla dimidiata.—BRAZIL: Brasília National Park, Distritio Federal (K. J. Zimmer, 5); Emas National Park, Goiás (K. J. Zimmer, 4); Patos de Minas, Minas Gerais (A. Whittaker, 1); Retiro das Pedras, Distrito Federal (K. J. Zimmer, 3). PARAGUAY: San Luis National Park (M. B. Robbins, 2; MLNS 120469–70).

Syndactyla (=Simoxenops) ucayalae.—BRAZIL: Alta Floresta region, Mato Grosso (K. J. Zimmer, 8); Serra dos Carajás, Pará (K. J. Zimmer, 4). PERU: Tambopata Research Center, dpto. Madre de Dios (K. J. Zimmer, 2).

APPENDIX 2

Syringes examined with country, sex, and institution catalogue numbers.

Anabacerthia variegaticeps.—PANAMA: male (KUNHM 86939)

Automolus roraimae.—GUYANA: females (KUNHM 93465; KUNHM 93464; NMNH 626785)

Automolus ochrolaemus.—GUYANA: male (KUNHM 92922)

Automolus infuscatus.—GUYANA: male (KUNHM 92921)

Automolus leucophthalmus.—PARAGUAY: male (KUNHM 88042)

Automolus rufipileatus.—GUYANA: male (KUNHM 89746)

Automolus rubiginosus.—ECUADOR: unsexed (KUNHM 65571); GUYANA: male (NMNH 621751)

Berlepschia rikeri.—GUYANA: male (NMNH 621990)

Hyloctistes subulatus.—PERU: male (KUNHM 87368)

Philydor erythrocercum.—GUYANA: males (KUNHM 89748–49)

Philydor lichtensteini.—PARAGUAY: male (KUNHM 88359)

Philydor atricapillus.—PARAGUAY: male (KUNHM 88043)

Philydor rufum.—PARAGUAY: male (KUNHM 87925)

Philydor pyrrhodes.—GUYANA: male (KUNHM 94833)

Syndactyla subalaris.—PANAMA: male (KUNHM 86937).

Syndactyla rufosuperciliata.—PARAGUAY: male (KUNHM 87921).

Syndactyla dimidiata.—PARAGUAY: female (KUNHM 88363); male (KUNHM 92935).

Thripadectes rufobrunneus.—PANAMA: male (KUNHM 86942)

APPENDIX 3

Syringeal characters from *Automolus*, *Philydor*, *Syndactyla* and related group species.

	1–5	6–10	11–15	16–20	21–22
Anabacerthia variegaticeps	10100	12011	1210?	?1120	00
Automolus roraimae	00111	1[12]201	03111	11111	00
Automolus ochrolaemus	00110	13202	01124	01120	01
Automolus infuscatus	00110	12113	01123	11121	01
Automolus leucophthalmus	00111	13114	02124	11121	00
Automolus rufipileatus	00120	13112	11123	01111	00
Automolus rubiginosus	00110	1002[01]	011[12][12]	11100	00
Berlepschia rikeri	20001	10211	02114	01133	00
Hyloctistes subulatus	00110	13114	01124	11120	00
Philydor erythrocercum	00101	12013	11122	01121	00
Philydor lichtensteini	00110	11211	22110	11110	01
Philydor atricapillus	00110	?2203	00023	11120	00
Philydor rufum	00110	11011	00010	01121	00
Philydor pyrrhodes	01121	11211	21122	11110	00
Syndactyla subalaris	00110	11200	13121	11121	00
Syndactyla rufosuperciliata	00111	11211	03120	11110	00
Syndactyla dimidiata	00111	11[02]11	0311[01]	11100	00
Thripadectes rufobrunneus	00111	03013	01123	01122	00

Description of syringeal characters

A and B elements: 1—Bronchial bifurcation beginning at element: (0) A-2, (1) A-3; 2—The composition of the elements is both osseous and cartilaginous from the element: (0) A-3, (1) A-2; 3—Ventral widening of the element A-3: (0) absent, (1) present; 4—Elements A-2 and A-3: (0) not fused, (1) dorsally fused, (2) dorsally and ventrally fused.

Membranae tracheales: 5—Caudal extreme of the ventral *Membrana trachealis* at element: (0) A-4, (1) A-3; 6—Caudal extreme of the dorsal *Membrana trachealis* at element: (0) A-2, (1) A-3; 7—Cranial extreme of the ventral *Membrana trachealis* at element: (0) A-9, (1) A-10, (2) A-11, (3) A-12; 8—*Membrana trachealis* elements are: (0) cartilaginous, (1) both, cartilaginous and ossified, (2) ossified; 9—*Membrana trachealis*: (0) with narrow elements, (1) with very narrow elements, (2) almost without elements.

Processi vocales: 10—Number of elements at the extension of *Processi vocales*: (0) 9, (1) 10, (2) 11, (3) 12, (4) 13; 11—Horns in *Processi vocales*: (0) absent, (1) present ventrally, short, (2) present ventrally, long; 12—*Processi vocales*: (0) narrow caudal extreme with narrowed cranial extreme, (1) broad caudal extreme with narrow cranial extreme, (2) broad cranial extreme and broader caudal extreme, (3) rounded; 13—Outline in lateral view of *Processus vocalis*: (0) it narrows abruptly, (1) it narrows smoothly.

Drum: 14—Drum A elements: (0) not fused (=no drum), (1) partially fused, (2) totally fused; 15—Drum cranial limit at element: (0) A11, (1) A12, (2) A13, (3) A14, (4) A15; 16—Elements which comprise the drum are: (0) more narrow dorsally and ventrally, (1) with uniform width.

Muscles—Intrinsic muscles: 17—Intrinsic muscles: (0) absent, (1) present; 18—Cranial insertion of *M. vocalis ventralis* and *dorsalis*: (0) anterior to the drum, (1) in the drum; 19—Insertion of ventral intrinsic muscles at element: (0) A-3, (1) A-4, (2) A-5, (3) A-6; 20—Insertion of dorsal intrinsic muscles at element: (0) A-3, (1) A-4, (2) A-5, (3) A-6. *Extrinsic muscles*: 21—*M. sternotrachealis* cranial insertion: (0) at the cranial extreme of *Processi vocales*, (1) at the cranial extreme of *Processi vocales* and the A elements cranial to *Membranae tracheales*; 22—*M. tracheolateralis* caudal insertion: (0) cranial to the drum or the element immediately cranial to *Membranae tracheales*, (1) in the drum or the element immediately cranial to *Membranae tracheales*.

A revision of *Vermivora* (Parulidae), with the description of a new genus

by George Sangster

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The genus *Vermivora* Swainson, 1827, currently comprises nine species (Curson *et al.* 1994, AOU 1998, Dickinson 2003). The genus includes three rather colourful species found in eastern North America—*V. pinus* (Linnaeus, 1766), *V. chrysoptera* (Linnaeus, 1766) and *V. bachmanii* (Audubon, 1833), of which the latter is possibly extinct—and six rather plain species whose ranges are concentrated on northern and western North America: *V. peregrina* (A. Wilson, 1811), *V. celata* (Say, 1823), *V. ruficapilla* (A. Wilson, 1811), *V. virginiae* (S. F. Baird, 1860), *V. crissalis* (Salvin and Godman, 1889) and *V. luciae* (J. G. Cooper, 1861). Two further species, *Parula gutturalis* (Cabanis, 1860) of Costa Rica and western Panama, and *P. superciliosa* (Hartlaub, 1844) of Central America, are currently placed in *Parula* Bonaparte, 1838 (Curson *et al.* 1994, AOU 1998, Dickinson 2003) but have been included in *Vermivora* by some authors (e.g. Hellmayr 1935, Lowery & Monroe 1968, Webster 1997).

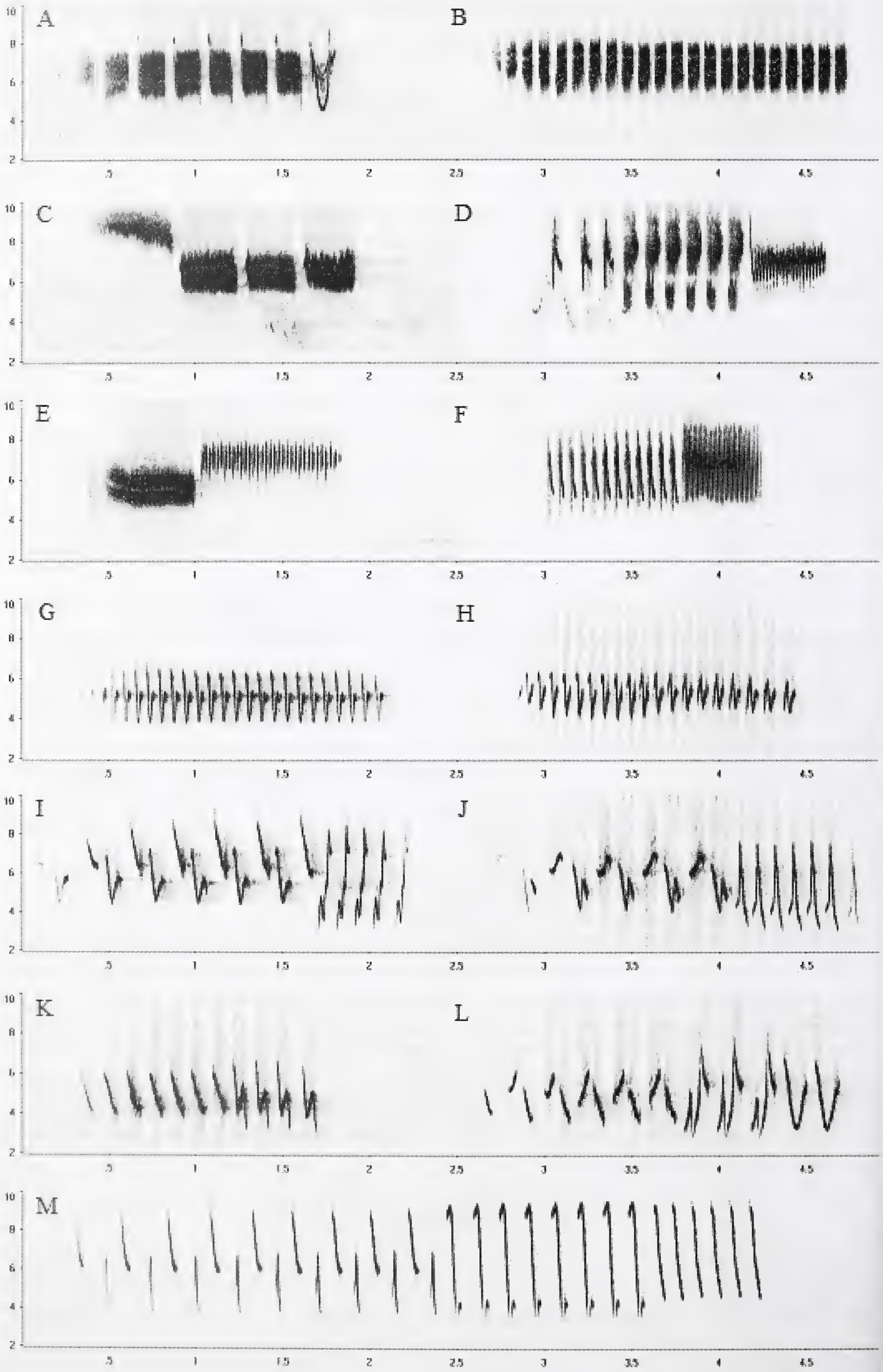
Systematics

Three independent molecular phylogenetic studies indicate that *Vermivora*, as presently constituted, is polyphyletic. Avise *et al.* (1980) used protein differentiation to construct a phylogeny of 28 species of parulids, including four species of *Vermivora*. They found sister-group relationships between *V. pinus* and *V. chrysoptera* and between *V. celata* and *V. peregrina*. However, these two pairs were not closely related. Klein *et al.* (2004) examined mitochondrial cytochrome-*b* sequence data (1,140 bp) of 50 parulids, including all extant species of *Vermivora* plus *P. gutturalis* and *P. superciliosa*. Their results corroborated and extended those of Avise *et al.* (1980): *V. pinus* and *V. chrysoptera* were found to be sister taxa, whilst the six 'plain' species of *Vermivora* formed a second, distantly related clade. Lovette & Hochachka (2006), who examined mitochondrial sequence data (4,116 bp) of 43 North American parulids, also found a sister-group relationship between *V. pinus* and *V. chrysoptera* and a distantly related clade of 'plain' species of *Vermivora*.

Recent studies have also clarified the position of *P. gutturalis* and *P. superciliosa*. Klein *et al.* (2004) found that *P. gutturalis* and *P. superciliosa* are sister to the clade of plain species of *Vermivora*, and are not closely related to either *P. americana* or *P. pitiayumi* with which they are currently included in the genus *Parula*. Another molecular study based on mitochondrial DNA sequences found that *P. gutturalis* clustered with *V. ruficapilla*, rather than with *P. americana* (Lovette & Bermingham 2002). The latter study included only three species of *Vermivora* and *Parula* but was based on long DNA sequences (3,638 bp). In a study of the skeletal characters of New World warblers, Webster (1997) concluded that *P. gutturalis* and *P. superciliosa* belong in *Vermivora* rather than *Parula* based on their long retroarticular processes.

Taxonomy

The polyphyly of *Vermivora* and the position of *P. gutturalis* and *P. superciliosa* close to the 'plain' clade of *Vermivora* warblers warrant a revision of the generic limits of *Vermivora*. The evidence summarised above indicates that the eastern clade (*V. pinus, V. chrysoptera*)


A
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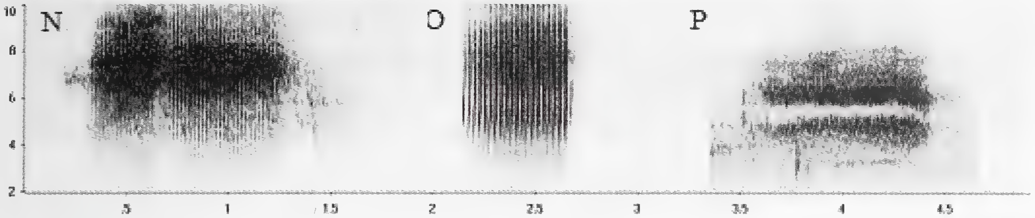

Figure 1. Sonograms of songs of *Vermivora* (A–F), *Leiothlypis* (G–M) and *Oreothlypis* (N–P) warblers. (A) *Vermivora bachmanii*, Virginia, USA, May, Arthur A. Allen (Borror & Gunn 1985); (B) *V. bachmanii*, South Carolina, USA, May, Stuart Keith (Borror & Gunn 1985); (C) *V. chrysoptera* type 1 song, Ohio, USA, May, Donald J. Borror (Borror & Gunn 1985); (D) *V. chrysoptera* type 2 song, New York, USA, May, Lang Elliott (Elliot 1997); (E) *V. pinus* type 1 song, Ohio, USA, May, Donald J. Borror (Borror & Gunn 1985); (F) *V. pinus* type 2 song, New York, USA, May, Lang Elliott (Elliot 1997); (G) *Leiothlypis celata*, Saskatchewan, Canada, June, John Neville (Neville 2005); (H) *L. crissalis*, Texas, USA, May, William W. H. Gunn (Borror & Gunn 1985); (I) *L. ruficapilla ruficapilla*, New York, USA, June, Lang Elliott (Elliot 1997); (J) *L. ruficapilla ridgwayi*, Washington, USA, May, Ken J. Hall and Peter R. B. Ward (Hall & Ward 1983); (K) *L. luciae*, Arizona, USA, June, Donald J. Borror (Borror & Gunn 1985); (L) *L. virginiae*, Colorado, USA, June, Donald J. Borror (Borror & Gunn 1985); (M) *L. peregrina*, Quebec, Canada, June, Lang Elliott (Elliot 1997); (N) *Oreothlypis superciliosa sodalis*, Sinaloa, Mexico, July, John W. Hardy (Hardy *et al.* 1994); (O) *O. superciliosa mexicana*, San Luis Potosí, Mexico, May, Ben B. Coffey (Hardy *et al.* 1994); (P) *O. gutturalis*, Cartago, Costa Rica, March, Kevin J. Zimmer (Hardy *et al.* 1994). X axis in seconds, Y axis in kHz.

and the plain species forming the northern/western clade should be placed in separate genera, and that *P. gutturalis* and *P. superciliosa* form a third group. The 'plain' species and *P. gutturalis* and *P. superciliosa* are sister groups and thus may be combined in a single genus or, alternatively, be recognised as two genera.

All three groups strongly differ in plumage (e.g. Curson *et al.* 1994). *V. pinus* and *V. chrysoptera* have distinctive head and wing patterns that are not found in any of the species of the two other groups. The six 'plain' species lack distinctive features, although some have a yellow (*V. crissalis*) or rufous (*V. luciae*) rump, or a (concealed) rufous crown patch (*V. celata, V. ruficapilla, V. crissalis, V. luciae*). *P. gutturalis* and *P. superciliosa* are colourful species. Adult male *P. gutturalis* has a black mantle and lores, and a bright orange throat and upper breast. Adult male *P. superciliosa* has an olive-green mantle, a broad white supercilium, a bright yellow throat and breast, with a distinctive chestnut mark across the breast.

The three groups can also be distinguished by their songs. *V. pinus* and *V. chrysoptera* have two types of song (Gill & Lanyon 1964). Type 1 songs (Fig. 1c and 1e) seem to be used primarily in the early breeding season in male–female communication (Ficken & Ficken 1969, Gill & Murray 1972a). Type 1 songs are characterised by two (*V. pinus*) or more (*V. chrysoptera*) buzzes of short duration (<0.5 seconds) over a narrow-frequency band (<2 kHz). Type 2 songs (Fig. 1d and f) are more prevalent after incubation and function primarily in male–male interactions (Ficken & Ficken 1969, Gill & Murray 1972a). Type 2 songs of both species also include buzzes. The characteristics of the buzzes of type 1 and 2 songs were described in detail by Gill & Murray (1972b).

Songs of *P. gutturalis* and *P. superciliosa* consist of a single buzzy trill (Fig. 1n–p), which differs from the buzzes of *V. pinus* and *V. chrysoptera* in having a broad-frequency band (>3 kHz) and a longer duration. The total duration of the songs of *P. gutturalis* and *P. superciliosa*, however, is shorter than that of *V. pinus* and *V. chrysoptera*.

Songs of the six 'plain' species of the northern/western clade differ strongly from those of the other two clades by their of lack rapid buzzes and their much slower tempo (Fig. 1g–m). As a result, songs of the 'plain' species are much clearer and separate notes can be discerned by human listeners. In addition, song notes of the 'plain' species are more complex than those of the other two clades, and often have both upslurred and downslurred elements. Furthermore, the duration of songs of the 'plain' species is more than 50% longer than that of *P. gutturalis* and *P. superciliosa*. The average song duration of all species in the 'plain' clade is 1.5 seconds or more (Stein 1968; pers. obs.), whereas 25 songs of *P. gutturalis* and 61 songs of *P. superciliosa* measured by the author were all less than 1.0 second (*P. gutturalis,* average 0.9 seconds, *n*=3; *P. superciliosa,* average 0.6 seconds, *n*=7). In fact, the songs of the 'plain' species are as distinct from those of *P. gutturalis*/*P. superciliosa* as they are from *V. pinus*/*V. chrysoptera*.

Thus, the three groups defined by molecular phylogeny are supported by differences in morphological and multiple acoustic characteristics. The dichotomy between the six 'plain' species and *P. gutturalis*/*P. superciliosa* is further underscored by a difference in migratory behaviour: all six 'plain' species are migrants, whereas both *P. gutturalis* and *P. superciliosa* are resident. On these grounds, I contend that the six 'plain' species and *P. gutturalis* and *P. superciliosa* should not be included in a single genus, and that all three groups be recognised as separate genera.

The position of Bachman's Warbler *V. bachmanii* has not been analysed using phylogenetic methods. However, from its plumage pattern, especially the presence of black on the throat and upper breast of the male, and its song, which consists of a series of short, narrow-frequency band buzzes (Fig. 1a–b) reminiscent of *V. chrysoptera* (Fig. 1c) and *V. pinus* (Fig. 1e), *V. bachmanii* is probably more closely related to *V. chrysoptera* and *V. pinus* than to the other two clades.

Nomenclatural consequences

The type species of *Vermivora* Swainson is *Certhia pinus* Linnaeus, 1766 (currently *Vermivora pinus*; see Oberholser 1905). Consequently, the generic name *Vermivora* should be restricted to *V. pinus* and *V. chrysoptera* and, provisionally, *V. bachmanii*. The names *Helminthophaga* Cabanis, 1851 (type: *Motacilla chrysoptera* Linnaeus, 1766, currently *Vermivora chrysoptera*) and *Helminthophila* Ridgway, 1882 (replacement name for *Helminthophaga* Cabanis, preoccupied) are synomyms of *Vermivora* (Oberholser 1905, Hellmayr 1935).

The name *Oreothlypis* Ridgway, 1884 (type species *Compsothlypis gutturalis* Cabanis, 1860), which currently rests in the synonymy of *Parula* or *Vermivora* (depending on the generic placement of *P. gutturalis*), is available for *P. gutturalis* (Cabanis, 1860) and *P. superciliosa* (Hartlaub, 1844). The name *Oreothlypis* should be reinstated for *O. gutturalis* and *O. superciliosa*.

No generic name has been proposed for the clade formed by the six 'plain' species (Ridgway 1902, Hellmayr 1935, Lowery & Monroe 1968). Therefore, I propose a new genus taxon for this clade.

***Leiothlypis*, gen. nov.**

Type species
Sylvia peregrina Wilson, 1811 (currently *Vermivora peregrina*).

Diagnosis.—Differs from *Oreothlypis* (*O. gutturalis* and *O. superciliosa*) in plain plumage without black markings on the head, upperparts and underparts. Differs from *Vermivora* (*V. pinus, V. chrysoptera, V. bachmanii*) in the plain head and wing pattern.

Taxonomic content.—The genus *Leiothlypis* includes six currently recognised species: *L. peregrina* (A. Wilson, 1811), *L. celata* (Say, 1823), *L. ruficapilla* (A. Wilson, 1811), *L. virginiae* (S. F. Baird, 1860), *L. crissalis* (Salvin and Godman, 1889) and *L. luciae* (J. G. Cooper, 1861).

Etymology.—The name *Leiothlypis* is derived from the Greek λείος, meaning plain and the Greek θλυπίς, the name of a kind of finch said to be found in the codices of Aristoteles (Stejneger 1884). The gender of the name *Leiothlypis* is feminine.

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A new genus for the waterthrushes (Parulidae)

by George Sangster

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The genus *Seiurus* Swainson, 1827, currently comprises three universally recognised species (Lowery & Monroe 1968, AOU 1998, Dickinson 2003). Northern Waterthrush *S. noveboracensis* (J. F. Gmelin, 1789) and Louisiana Waterthrush *S. motacilla* (Vieillot, 1809) are very similar and can be difficult to separate in the field (Binford 1971, Wallace 1980), whereas Ovenbird *S. aurocapilla* (Linnaeus, 1766) is unmistakable due to its very distinct head pattern and coloration, and its olive upperparts (Cramp & Perrins 1994). Inclusion of the waterthrushes and Ovenbird in a single genus implies a close relationship, but whilst Ovenbird and the waterthrushes do share some morphological and ecological traits, they are distinct in several others (Baird *et al.* 1875, Ridgway 1902, Eaton 1957, Griscom & Sprunt 1957, Bent 1963). Recent molecular phylogenetic studies indicate that *Seiurus* does not represent a monophyletic grouping and that generic separation is warranted.

Systematics

Barrowclough & Corbin (1978) described electrophoretically assayed protein variation and differentiation in 15 species of Parulidae. They inferred phylogenetic relationships of nine species for which 30 or more loci could be examined (*S. aurocapilla*, *S. noveboracensis*, four species of *Dendroica* and three species of *Vermivora*). Their study indicated rather large allele differences between *S. aurocapilla* and *S. noveboracensis* at *c.*5 of 30 loci. The two species were distinct from seven other parulids on an unrooted dendrogram. However, the small number of ingroup species and the lack of any outgroup species precluded an assessment of whether they are sister taxa or not.

Avise *et al.* (1980) also examined protein data but included more species in their phylogenetic analysis than Barrowclough & Corbin (1978). Their results indicated strong differentiation between *S. aurocapilla* and *S. noveboracensis*, which showed little overlap in electromorph frequences at five of 26 loci. A UPGMA dendrogram of 28 species of Parulidae indicated that *S. aurocapilla* and *S. noveboracensis* are not closely related.

Lovette & Bermingham (2002) used mitochondrial data to test monophyly of the Parulidae and included samples of *S. noveboracensis* and *S. aurocapilla*. Maximum likelihood and maximum parsimony trees of nucleotide-intensive (3,638 bp, 45 species including 35 parulids) and taxon-intensive (1,935 bp, 82 taxa including 36 parulids) analyses indicated that *S. noveboracensis* and *S. aurocapilla* are not closely related. Maximum likelihood analyses indicated that *S. noveboracensis* is sister to a clade of *Catharopeza bishopi*, *Parula americana*, *Setophaga ruticilla* and the three *Dendroica* species included in the study. This relationship was strongly supported (0.91 posterior probability). *S. aurocapilla* was sister to all other wood-warblers, including *S. noveboracensis*, except for a few aberrant species that formed part of other clades (e.g. Cardinalini) and should be excluded from Parulidae (Lovette & Bermingham 2002). Maximum parsimony trees were less resolved but supported the non-sister group relationship of *S. aurocapilla* and *S. noveboracensis*.

Hebert *et al.* (2004) analysed a 648-bp region of the mitochondrial gene cytochrome-*c* oxidase I (COI) for 260 species of North American birds, including 22 parulids. A neighbour-joining tree based on Kimura two-parameter distances indicated that *S. aurocapilla* and *S. noveboracensis* are not closely related, and placed these taxa on separate branches. A drawback was that branch support was not presented and may be low.

Klein *et al.* (2004) studied mitochondrial cytochrome-*b* sequence data (1,140 bp) of 56 species, including *S. aurocapilla* and *S. motacilla*, and 48 other parulids. Their study included shorter sequences but more ingroup taxa than Lovette & Bermingham (2002). *S. aurocapilla* was found to be sister to a large clade which included all species of Parulidae except a few 'oddball' genera probably best assigned to other families (e.g. *Icteria virens*, *Xenoligea montana*, *Microligea palustris*, *Teretistris fernandinae*). The position of *S. motacilla* was unstable between parsimony analyses with different weighting schemes. Although strong support for its relationships to other species was not identified, *S. motacilla* was not closely related to *S. auricapilla* in any of the trees of this study.

Most recently, Lovette & Hochachka (2006) presented a phylogeny of 43 North American Parulidae, including all three *Seiurus* species, based on Bayesian analysis of long mtDNA sequences (4,116 nucleotides). The waterthrushes were shown to be sister taxa. *S. aurocapilla* was found to be sister to all other 'true' Parulidae species examined (including *S. noveboracensis* and *S. motacilla*), supporting the polyphyly of *Seiurus* as currently constituted.

Taxonomy and nomenclature

Polyphyly of *Seiurus* is supported by five studies (Avise *et al.* 1980, Lovette & Bermingham 2002, Hebert *et al.* 2004, Klein *et al.* 2004, Lovette & Hochachka 2006). That by Barrowclough & Corbin (1978) did not include an outgroup, but their unrooted dendrogram is consistent with the phylogenetic trees of Lovette & Bermingham (2002) and Klein *et al.* (2004), if the root is placed on the lineage leading to *S. aurocapilla*. Because polyphyly of *Seiurus* is documented by several studies with high support values in some, Ovenbird and the waterthrushes should be recognised as separate genera. The distant phylogenetic position of the Ovenbird and the waterthrushes indicates that similarities in morphology (marked underparts, lack of rictal bristles) and ecology (terrestrial lifestyle) probably reflect convergence rather than common ancestry (Klein *et al.* 2004).

The name *Seiurus* was established by Swainson (1827a), who subsequently designated *S. aurocapilla* (Linnaeus, 1766) as its type species (Swainson 1827b). The evidence reviewed above implies that the generic name *Seiurus* should be restricted to Ovenbird; *Seiurus* thus becomes a monotypic genus.

The synonymy of *Seiurus* includes five names (Ridgway 1902, Hellmayr 1935): *Enicocichla* G. R. Gray, 1840 (type species: *Motacilla aureocapilla* [Linnaeus, 1766], hence a junior synonym of *Seiurus*); *Siurus* Strickland, 1841 (subsequent spelling of *Seiurus*); *Senurus* Reichenbach, 1849 (subsequent spelling of *Seiurus*); *Henicocichla* Cabanis, 1851 (subsequent spelling of *Enicocichla*); and *Exochocichla* van der Hoeven, 1855 (new name for *Seiurus*). None of these, however, is applicable to the waterthrushes. Because no generic name is currently available for the Northern and Louisiana Waterthushes, this group may be known as:

Parkesia, gen. nov.

Type species

Motacilla noveboracensis J. F. Gmelin, 1789 (currently *Seiurus noveboracensis*).

Diagnosis.—The two species of *Parkesia* are large, terrestrial parulids with plain upperparts and streaked underparts. *Parkesia* most closely resembles *Seiurus aurocapilla* but differs in (1) absence of an orbital ring, (2) presence of white or yellowish superciliary, (3) presence of dusky pre- and postocular stripe, (4) crown uniformly olive or sooty-brown without (pale) rufous central crown-stripe and dark lateral crown-stripes, and (5) upperparts dark olive- to grey-brown.

Some of the studies cited above suggest that *Parkesia* is closely related to *Catharopeza bishopi, Setophaga ruticilla, Parula americana* and *Dendroica*. *Parkesia*, however, clearly differs from all these; from *Catharopeza bishopi* mainly in (1) presence of a pale supercilium, (2) streaked underparts and (3) olive- to grey-brown crown and upperparts; and from all species of *Dendroica* and from *Setophaga ruticilla, Parula americana* and *P. pitiayumi* by a combination of (1) lack of pale wingbars, (2) presence of a white or yellowish superciliary and (3) plain upperparts.

Taxonomic content.—*Parkesia* comprises two extant species: *P. noveboracensis* (J. F. Gmelin, 1789) and *P. motacilla* (Vieillot, 1809). Based on their extremely similar morphology, a close relationship has been accepted ever since the two were recognised as separate species. Their sister relationship is also supported by molecular evidence (Lovette & Hochachka 2006).

Etymology.—It is a great pleasure to name this taxon for the late Kenneth C. Parkes, former curator at the Carnegie Museum of Natural History, Pittsburgh, to honour his lasting contributions to avian taxonomy, moult terminology, hybridisation and faunistics. Attachment of his name to the waterthrushes is appropriate given his long interest in Parulidae (e.g. Parkes 1951, 1961, 1978, 1995, Keppler & Parkes 1972, Latta *et al*. 1998, Latta & Parkes 2001). The gender of the name *Parkesia* is feminine.

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The range of Long-tailed Cinclodes *Cinclodes pabsti* extends to Minas Gerais (Brazil)

by Guilherme Henrique Silva de Freitas, Lílian Mariana Costa, Jordana Demicheli Ferreira & Marcos Rodrigues

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Long-tailed Cinclodes *Cinclodes pabsti* is an ovenbird endemic to the highlands of Rio Grande do Sul and Santa Catarina, southern Brazil (Sick 1973). Besides *C. pabsti*, 12 other species are currently recognised in *Cinclodes*, ten of them restricted to the Andes, ranging from Venezuela to Argentina (Tierra del Fuego) and some at very high elevations. The other two species are endemic to isolated highlands in southern Córdoba and San Luis, Argentina (Ridgely & Tudor 1989, Remsen 2003).

The occurrence of Long-tailed Cinclodes in southern Brazil—disjunct from its congeners—evidences the biogeographical relationship between faunas of the Andes and the mountains of southern Brazil (Simpson-Vuilleumier 1971, Simpson 1979, Sick 1985, Safford 1999, Cheeser 2004), which is important for a better understanding of the geographical history of South America.

The presence of Long-tailed Cinclodes in Minas Gerais, *c*.1,000 km north of its northernmost known locality, is reported here. Serra do Cipó (19°12′–19°34′S, 43°27′–43°38′W) is in central Minas Gerais, south-east Brazil, in the southern Espinhaço range. Altitudinal range is *c*.800–1,600 m (Melo-Junior *et al*. 2001). These mountains separate two important biomes: the Atlantic Forest to the east and the *Cerrado* (Brazilian savanna) to the west (Giulietti *et al*. 1997). The highest parts of the Espinhaço comprise *campos rupestres*, grassland with many endemic plant taxa growing on shallow-ground rocky outcrops, with scattered shrubs and small trees (Giulietti *et al*. 1997).

The first record was on 29 December 2006, when a single was observed foraging near a small lodge in Serra do Cipó National Park, Barraco de Tábua (19°21′S, 43°29′W; 1,496 m). In January 2007 one was photographed near a lodge locally known as Alto do Palácio, within the park boundaries (19°15′S, 43°31′W; 1,345 m). What was presumably the same bird remained there until 26 February 2007. The photograph was compared to specimens in the

Museu de Ciências Naturais do Jardim Botânico de Porto Alegre, confirming the identification. On 4 May 2007, two were observed singing near Barraco de Tábua and on 27 February 2008 one was collected in the same place. The specimen is an adult male, mass *c*.40 g and total length 22.5 cm, and is retained in the ornithological collection of the Departamento de Zoologia, Universidade Federal de Minas Gerais, Belo Horizonte (DZUFMG 5763).

It is remarkable that *C. pabsti* had gone unrecorded at Serra do Cipó, as the locality has been well surveyed by ornithologists for many years (Willis & Oniki 1991, Melo-Junior *et al.* 2001, Rodrigues *et al.* 2005). Our observations suggest that an overlooked population occurs in the highest parts of the Serra do Cipó, supporting the biogeographical relationship of the Espinhaço range with the Andes and the mountains of southern Brazil (Vielliard 1990, Silveira & Cure 1993, Stehmann & Semir 2001, Vasconcelos *et al.* 2006). Further surveys are needed to assess the status of the species in the area and to check for possible geographic and genetic variation in this isolated population.

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Ideas for future publications and policy should be referred direct to the **BOC: Prof. R. A. Cheke, Hon. Publications Officer BOC, Natural Resources Institute, University of Greenwich at Medway, Central Avenue, Chatham Maritime, Chatham, Kent ME4 4TB (e-mail: r.a.cheke@greenwich.ac.uk)**.

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Authors are invited to submit papers on topics relating to the broad themes of taxonomy and distribution of birds. Descriptions of new species of birds are especially welcome and will be given priority to ensure rapid publication, subject to successful passage through the normal peer review procedure, and wherever possible should be accompanied by colour photographs or paintings. On submission, manuscripts, **double-spaced** and with **wide margins**, should be sent to the Editor, Guy Kirwan, preferably by e-mail, to GMKirwan@aol.com. Alternatively, **two copies** of manuscripts, typed on one side of the paper, may be submitted to the Editor, 74 Waddington Street, Norwich NR2 4JS, UK. Where appropriate half-tone photographs may be included and, where essential to illustrate important points, the Editor will consider the inclusion of colour figures (if possible, authors should obtain funding to support the inclusion of such colour illustrations).

As far as possible, review, return of manuscripts for revision and subsequent stages of the publication process will be undertaken electronically.

For instructions on style, see the inside rear cover of Bulletin 128 (1) or the BOC website

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Bulletin of the British Ornithologists' Club

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Volume 128 No. 4
December 2008

MEETINGS are normally held in the **Sherfield Building** of **Imperial College**, South Kensington, London SW7. The nearest Tube station is at South Kensington; a map of the area will be sent to members, on request. (Limited car parking facilities can be reserved [at a special reduced charge of **£5.00**], on prior application to the Hon. Secretary.)

The cash bar is open from **6.15 pm**, and a buffet supper, of two courses followed by coffee, is served at **7.00 pm.** (A vegetarian menu can be arranged if ordered at the time of booking.) Informal talks are given on completion, commencing at about 8.00 pm.

Dinner charges are **£22.50** per person.

FORTHCOMING MEETINGS

See also BOC website: **http://www.boc-online.org**

Please note: the provisional dates for meetings in 2009 advertised in Bulletin 128(3) have been amended and are now confirmed as follows:

3 February
10 March
29 April—AGM—note that this is a Wednesday
23 June
6 October
24 November

The venue for all meetings in 2009 will be in the Ante-room on the ground floor of the Sherfield Building, Imperial College, South Kensington.

3 February—Douglas G. D. Russell (Curator, Bird Group, Natural History Museum)—*The Worst Journey in the World: an ornithological tale of bravery and endurance*. In the depths of the Antarctic midwinter of 1911 three men embarked on one of the most difficult and dangerous ornithological expeditions ever undertaken. Braving cold and misery that is difficult to imagine, they trod silently in darkness around Ross Island to retrieve three of the hardest won specimens in the Natural History Museum (NHM) bird collections. The tale of the five weeks they spent battling against the winter weather, sheer bad luck and their own fears, to bring back early embryos of the Emperor Penguin, required to test a then current theory in evolutionary biology, was superbly told by Apsley Cherry Garrard in his narrative of Scott's last expedition. Drawing on unpublished information from the NHM archives and elsewhere, the talk will précis the story itself and place the tale in the context of Scott's overall Antarctic research and the ornithology of the expedition as a whole.

Applications to Hon. Secretary (address below) by **20 January 2009**

10 March—Thomas Donegan (Fundación ProAves)—*Ornithological exploration in the Colombian Andes*. Thomas and his colleagues have been undertaking field expeditions in Colombia's Andes for over ten years. These have led to the description of three new species and four subspecies, two national parks and five nature reserves being established, and hosts of range extensions, rediscoveries and other findings. Colombia is one of the few countries in the world where ornithological exploration (as opposed to the study of previously known areas) is ongoing. The country's long-running civil war makes for an interesting background to ornithological exploration, as remote regions are frequently controlled by armed non-government groups. The talk will focus on explorations of two previously unstudied and geographically isolated mountain ranges, the San Lucas and Yaríguies mountains. There will be something here for everyone: joy, love, tears, toil and, of course, photographs of beautiful tropical birds.

Applications to Hon. Secretary (address below) by **24 February 2009**

Overseas Members visiting Britain are especially welcome at these meetings, and the Hon. Secretary would be very pleased to hear from anyone who can offer to talk to the Club giving as much advance notice as possible—please contact: S. A. H. (Tony) Statham, Ashlyns Lodge, Chesham Road, Berkhamsted, Herts. HP4 2ST, UK. Tel. +44 (0)1442 876 995 (or e-mail: **boc.sec@bou.org.uk**).

Contributors See the March issue of each volume for guidelines or the BOC website Bulletin pages, at www.boc- online.org/bulletin.htm

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Bulletin of the
BRITISH ORNITHOLOGISTS' CLUB

Vol. 128 No. 4 Published 5 December 2008

CLUB ANNOUNCEMENTS

The Committee welcomes the following new members who recently joined the Club and have not been previously notified: Dr J. Bates (USA), Mr W. Bryne (Republic of Ireland), Mr S. Gillies (Scotland), Ms Yang Liu (Switzerland), Mr W. L. McCleland (South Africa), Mr A. Pittie (India), Dr John S. Pringle (UK) and Mr Carlos A. Santos (Brazil).

Members are reminded that subscriptions for 2009 are due on 1 January and are kindly asked to check that any standing orders with their banks are recorded at the correct amount (£20 per annum). Regrettably several members are still paying incorrect subscription rates, causing the Club unnecessary time and expense in administration duties.

The 951st meeting of the Club was held on Tuesday 8 July 2008, in the Rector's Residence at 170 Queens Gate, Imperial College, London. Twenty members and eight guests were present.

Members attending were: Cdr. M. B. CASEMENT RN (*Chairman*), Miss H. BAKER, Mrs D. M. BRADLEY, D. R. CALDER, Dr J. COOPER, J. B. FISHER, F. M. GAUNTLETT, Revd. T. W. GLADWIN, D. GRIFFIN, K. HERON JONES, R. H. KETTLE, D. J. MONTIER, P. J. OLIVER, R. C. PRICE, Dr R. P. PRŶS-JONES, P. J. SELLAR, S. A. H. STATHAM, C. W. R. STOREY, M. J. WALTON and P. J. WILKINSON.

Guests attending were: D. BRADLEY, M. BRADLEY, Mrs J. CALDER, Mrs C. R. CASEMENT, Mrs M. H. GAUNTLETT, Mrs J. M. GLADWIN, Mrs J. HERON JONES and Mrs M. MONTIER.

After dinner, Dr Jo Cooper gave a talk about Charles Darwin entitled *Fancy that: pigeons, finches, chickens and the Origin of Species*. On the evening of 1 July 1858, at the Linnaean Society in London, the scientific world was changed forever by the reading of two papers on natural selection by Charles Robert Darwin and Alfred Russell Wallace. Taking place exactly a week after the 150th anniversary of the great event, this occasion presented the ideal opportunity to celebrate Darwin and the ornithological research that played a crucial role in the formation of his theory.

Popular myth still frequently credits the Galápagos finches, with their diversity of beak shapes and sizes, as Darwin's 'Eureka!' inspiration during the voyage of the *Beagle* (1831–36). While it is true that Darwin did gain an inspirational insight from the birds of the Galápagos, it was the archipelago's mockingbirds that provided this. Although this key point has been widely noted in ornithological and scientific literature, it is only just beginning to sink into popular culture. Darwin's critical observation was that on each of the islands he visited there was only one kind of resident mockingbird, and that each one was different from the others. The second specimen Darwin collected, of the bird now known as the Floreana Mockingbird *Nesomimus trifasciatus*, can be regarded as the vital one. By its larger size and diagnostic dark breast-band, it was so markedly different to the San Cristobal Mockingbird *N. melanotis* he had already obtained that Darwin realised it was almost certainly a separate species. It impressed him sufficiently to ensure that he recorded individual island localities for each of his mockingbird specimens; something he famously did not do with the finches. His hunch about the mockingbirds was later confirmed by John Gould, who also recognised that the finches were a single related group of birds. Following a conversation with Gould about the mockingbirds and the finches in 1837, Darwin opened his first notebook on species transmutation. However, more than 20 years would elapse before the *Origin of species* finally reached publication.

The birds of the Galápagos had shown Darwin that species might change, but did not provide him with sufficient evidence to explain how this might occur. So, in 1855, Darwin took up keeping fancy pigeons, with a view to exploring natural selection through artificial selection. In addition to the collection he established in aviaries at his home at Down House, Kent, he also solicited specimens of pigeons and other domestic birds, particularly ducks and chickens, from correspondents around the world. Darwin meticulously studied his collection of pigeons, both living and dead, enthusing about them to various correspondents. However, his dedication to pigeons seems to have exasperated some of his friends, notably Charles Lyell, who seemed more alert to the danger posed to Darwin's priority on natural selection by delaying publication to gather yet more data. Eventually, the shocking arrival, in 1858, of Wallace's Ternate Paper forced Darwin into publication.

In November 1859, *On the origin of species by means of natural selection* finally appeared. Given the fame of the finches, it can come as a surprise to discover that the first creatures to be discussed in any detail are fancy pigeons; the birds of the Galápagos get only a passing mention.

But Darwin was still not finished with pigeons and continued to work on them for almost another decade. In 1868, his exhaustive work *The variation of animals and plants under domestication* appeared. He had already begun to present his cherished pigeons to the British Museum in 1867, completing the transfer in 1868 and thereby marking the conclusion of his research. The entire collection comprises some 120 pigeon skins and skeletons, and nearly 50 chicken and duck skeletons, many of them still retaining Darwin's own labels and annotations.

From the birds of the voyage of the *Beagle* to fancy pigeons and chickens, the importance of ornithology in Darwin's work is clearly evident. Yet it is also clear that Darwin has been important to ornithology, enabling the study of birds to claim a pivotal role in the history of science. As the anonymous author of Darwin's obituary put it: 'We venture to believe that we shall be only echoing the voice of all our readers when we assert that there is not one of them but has felt the dignity of the study which he pursues was raised every time that Mr Darwin drew from it evidence in support of that theory with which his name will be in all time associated' (*Ibis*, 1882: 479–484).

REFEREES

I am grateful to the following, who have reviewed manuscripts submitted to the Bulletin during the last year (those who refereed more than one manuscript are denoted by an asterisk in parentheses): Norbert Bahr, Richard Banks, Bruce Beehler, Walter J. Bock, Hugh Boyd, Vincent Bretagnolle, Michael Brooke (*), Daniel Cadena, Caio Carlos, Terry Chesser, Nigel Cleere, Jo Cooper, John Cooper, Pierre-André Crochet, Andrés Cuervo, Edward C. Dickinson (*), Thomas Donegan (*), Bob Dowsett (*), Françoise Dowsett-Lemaire, Guy Dutson, Jon Fjeldså, Mike Fraser, Anthony J. Gaston, Jacob González-Solís, Steven Gregory (*), Steve N. G. Howell, Julian Hume, Mike Imber, Johan Ingels, Morton & Phyllis Isler, David James, Frederic Jiguet, H. Lee Jones, Niels Krabbe, Wayne Longmore, Storrs Olson (*), Fernando Pacheco (*), Alan Peterson (*), Robert Pitman, H. Douglas Pratt, Robert Prŷs-Jones, Marcos Raposo (*), Pamela C. Rasmussen, Van Remsen (*), Robin Restall, Mark Robbins, Kees Roselaar (*), Roger Safford, Richard Sale, Richard Schodde (*), Thomas S. Schulenberg, Frank Steinheimer (*), F. Gary Stiles, Marcelo Vasconcelos, Dick Watling, David Wells, Andrew Whittaker, Kevin J. Zimmer and Francis Zino.—The Editor

BRITISH ORNITHOLOGISTS' CLUB

Dinner Meetings – February & March 2009

BOOKING FORM

Because arrangements for meetings have to be made with Imperial College well in advance, Members are asked to send bookings **14 days beforehand**. If you book and subsequently find you are unable to attend, please notify the **Hon. Secretary** as soon as possible. If the booking is cancelled less than 5 days before a meeting, the payment will not normally be refunded, unless the booking can be offered to another member. (Late applications can usually be taken up to am. on the Friday preceding a meeting). Vegetarian meals can be provided - please make your request at the time of booking. **Limited car parking** (at a special charge of **£5.00** - this is no longer free), can be arranged on prior application to the ***Hon. Secretary***, giving details of car registration.

Have you recently looked at our website - **http://www.boc-online.org**?

✂---

Tuesday 10th March – Thomas M. Donegan - Fundacion ProAves - "*Ornithological exploration in the Colombian Andes*".

I wish to attend with ....guests. Name(s) of my guest(s)............................. ....

My cheque for .... **(£22.50** per head) is enclosed.

Name...Tel..................

➧ Please return (or e-mail) to: The **Hon. Secretary BOC,** (Tony Statham), Ashlyns Lodge, Chesham Road , Berkhamsted, Herts. HP4 2ST. Tel: 01442-876995 **by Tuesday 24th February**

✂---

Tuesday 3rd February – Douglas Russell, Curator, Bird Group, Natural History Museum– **"***The Worst Journey in the World: an Ornithological Tale of Bravery and Endurance"*

I wish to attend with ....guests. Name(s) of my guest(s)............................. ....

My cheque for .... **(£22.50** per head) is enclosed.

Name...Tel..................

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Vocal evidence for restitution of species rank to a Santa Marta endemic: *Automolus rufipectus* Bangs (Furnariidae), with comments on its generic affinities

by Niels Krabbe

Received 27 November 2007

Some passerines in the family Tyrannidae possess entirely innate songs (Stein 1963, Lanyon 1978, Kroodsma 1984, 1989, Kroodsma & Konishi 1991), with no local dialects. A similar lack of dialects in several other families strongly suggests that song is innate in nearly all suboscines, which has led to a recent re-evaluation of the taxonomic ranks of many forms (see, e.g., Remsen 2005). Several of these are members of the Furnariidae (Vaurie & Schwartz 1972, Whitney & Pacheco 1994, Kratter & Parker 1997, Zimmer 1997, 2002, Robbins & Zimmer 2005, Zimmer *et al.* 2008), which includes a large number of taxa that occur in dense and dark habitats, where vocalisations, rather than visual signals, probably play a major role in species recognition. The furnariid taxa *Furnarius cinnamomeus*, *F. longirostris*, *Synallaxis maranonica* and *Hyloctistes virgatus* are afforded species rank on the basis of vocal characters by some authors, whereas others (e.g. Remsen *et al.* 2007) await the publication of vocal studies before accepting taxonomic changes.

During field work to document the voices of birds in the Sierra Nevada de Santa Marta, northern Colombia, in February 2007, I ascertained that the songs of several endemic taxa presently treated as subspecies are quite distinct from purported conspecifics. The present paper addresses *Automolus rubiginosus rufipectus*, described as a full species, Ruddy Foliage-gleaner *A. rufipectus*, by Bangs (1898), which differs so much from its alleged conspecifics that even its generic placement may demand re-evaluation. *A. rufipectus* was ranked as a subspecies of *A. rubiginosus* by Hellmayr (*in* Cory & Hellmayr 1925), a treatment that has been widely followed until the present.

Methods

I tape-recorded songs of four individuals of *rufipectus* at 1,200–1,800 m in the recently established ProAves Colombia reserve 'El Dorado' on the San Lorenzo ridge in the northwestern part of the Sierra Nevada de Santa Marta, dpto. Magdalena, Colombia (11°06–08'N, 74°03–06'W). Birds were first taped under natural conditions and then attracted using playback for identification. Three of the four recorded birds were seen, and one was photographed (Fig. 1) near its nest. Eight months later, an individual was collected near this nest (C. D. Cadena, specimen in Universidad de Los Andes, Bogotá, catalogue number ANDES-O-0433). Recordings were made using a Sennheisser ME67 microphone and a Sony TCM5000 tape recorder with Type I cassettes. Two additional recordings of *rufipectus* were consulted (Boesman 1999, Strewe *et al.* 2003).

Sonograms were compared among *rufipectus* and all other species or vocally distinct subspecies or subspecies-groups of *Automolus*, *Hylocryptus*, *Anabazenops* and *Syndactyla*, the latter three genera all encompassing species formerly included in *Automolus*. Sonograms were generated using the sound-editing program CoolEdit Pro (Syntrillium Software), which was also used for vocalisation analysis.

Observations on habitat and behaviour were noted in the field and are compared with published information.

Results

Vocalisations.—A total of 196 song phrases (from 5–6 different individuals) of *rufipectus* were analysed. Songs consisted of resonant notes (3–4 harmonics), given in a series of 4–6 similar notes, loudest at 1,800–3,000 Hz (second or third harmonic). Individual notes were up–downstrokes, the downstroke slightly more pronounced, and the peak volume at highest pitch. The loudest pitch was the second harmonic (1,800–2,000 Hz) in two or three individuals, the third harmonic (2,400–3,000 Hz) in two individuals, and second and third equally loud in one individual. The song was usually given in sets of two (less commonly one, rarely three) phrases, with a brief pause of 0.3–0.5 seconds between the two phrases. The first of the two phrases frequently had an extra, often slightly weaker and lower pitched introductory note, and was thus longer (0.42 ± 0.04 seconds) than the second (0.36 ± 0.03 seconds). The double phrases were delivered fairly regularly with pauses between them 2–4 seconds long.

All the individuals of *rufipectus* compared had similar songs, differing in virtually all aspects from songs of other forms of *Automolus rubiginosus* (Figs. 2a–i, 3a–b), the only similarities being the length of the song phrases and the tendency of *rufipectus* to deliver two song phrases in succession, a tendency also noticed in some individuals of other forms of *A. rubiginosus* from both Central America (*rubiginosus*, *veraepacis*, *saturatus*) and the Amazon (unnamed taxon). The song of *rufipectus* was more similar, indeed remarkably so, to the song of *Hylocryptus erythrocephalus* (Fig. 3b–c).

Calls of *rufipectus* recorded were churrs, two- to three-noted whilst foraging (Fig. 4d) and three- to four-noted when given in alarm (Fig. 4e), at 0.8–2.0 kHz (first and second, or second and third harmonic), lower pitched than song and differing distinctly from calls of both *A. rubiginosus* (Fig. 4a–b) and *Hylocryptus erythrocephalus* (Fig. 4c), which in turn have fairly similar calls except for the latter being lower pitched. No call resembling the high-pitched (4 kHz) call (not shown) purportedly given by *H. erythrocephalus* (Coopmans *et al.* 2004, cut 5; misidentified?) was ever heard from *rufipectus*.

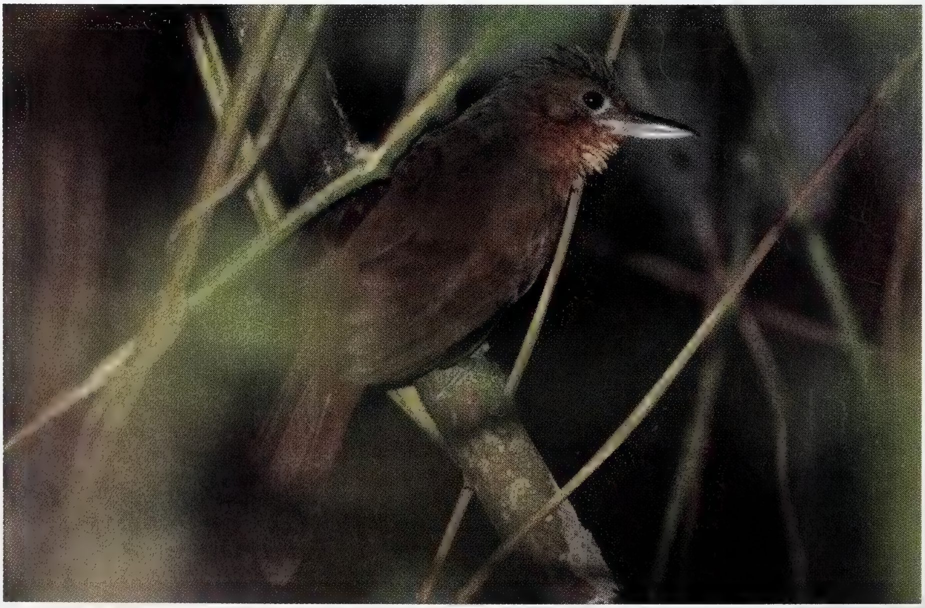

Figure 1. *Automolus rufipectus*, Sierra Nevada de Santa Marta, Colombia, February 2007 (Joe Tobias)

Songs of eight of the other 13 currently recognised subspecies of *A. rubiginosus* (Remsen 2003), as well as of an unnamed taxon from the Amazonian lowlands, were compared (Fig. 2a–i). They all consist of a single, 0.3–0.6 seconds-long, distinctly rising note, sometimes (with intra-individual variation) possessing a short introductory note. As in other species of *Automolus*, the notes are highly resonant (with 3–4 audible harmonics), and as in *rufipectus* the pitch is variable. The single recording of the unnamed taxon from the Amazonian lowlands (all other forms being lower montane) is decidedly higher pitched (Fig. 2i), thus suggesting an isolated position of this form. The five forms for which no recordings were avilable at the time of the study were *guerrensis*, *fumosus*, *cinnamomeigula*, *venezuelanus* and *caquetae*. Songs of the former four are described as being similar to songs of adjacent forms (Howell & Webb 1995, Stiles & Skutch 1989, Hilty 2003; A. M. Cuervo pers. comm.). Only *caquetae* appears to be vocally unknown, but its poor morphological differentiation from, and seemingly continuous distribution with *brunnescens* suggest that it may be also similar.

Natural history.—On three occasions *rufipectus* was observed foraging. It remained within 0.5 m of the ground, and spent most of its foraging time on the ground, rummaging among large dead leaves as does *Hylocryptus erythrocephalus* (Ridgely & Greenfield 2001, Remsen 2003; pers. obs.), only once pecking briefly at a decaying trunk as does *Automolus rubiginosus* regularly (Remsen 2003; J. A. Tobias pers. comm.). This concurs with Todd & Carriker (1922), who wrote that it 'does little climbing, but keeps hopping about on or near the ground'. A vertical bank with several entry holes 1–2 m above was found. The bird would always leave from the same hole when disturbed, but when entering, it would usually briefly enter one of the other holes before moving to the final one.

Habitat.—*A. rufipectus* was found in forest and second-growth habitats, which were transitional between the dry *Acacia* scrub at sea level and the humid forest above 2,100 m, but more similar to the latter. The undergrowth was dense, and the litter included many large leaves. In February, a dry month with occasional rain, the habitat at 1,200–1,800 m was reminiscent of dry-forest haunts of *Hylocryptus erythrocephalus* in south-west Ecuador and north-west Peru. On two occasions I found *rufipectus* in heavily disturbed areas. Todd & Carriker (1922) noted: 'It is partial to the heavy forest or thick second growth, and is fond of dark tangles and ravines'. I did not find it or its habitat above 1,800 m on the San Lorenzo ridge 70 km east-north-east of Pueblo Viejo (the type locality). This is evidently in agreement with Carriker's experience; although the type of *rufipectus* was originally said to have been taken at *c*.8,000 feet [2,438 m] (Bangs 1898), Todd & Carriker (1922) gave the species' altitudinal range as 3,000–6,000 feet [914–1,829 m], and added the note '7500 feet, according to Mr Brown' [the collector of the type]. The nest I found on the San Lorenzo ridge was at *c*.1,750 m.

Distribution, population and conservation.—All records are from the north-western and northern slopes of the Santa Marta Mountains. Collecting sites are from around the San Lorenzo ridge (Cincinnati; Las Vegas; Agua Dulce) and in the upper río Ancha drainage (La Concepción; San Antonio; Pueblo Viejo; Chirua; Heights of Chirua) in dptos. Magdalena and Guajira (Todd & Carriker 1922). These and some additional, more recent sight or vocal records were mapped by R. Strewe, G. Lobaton & S. Sanchez, of Fundación ProSierra Nevada, in 2004 (see http://www.alpec.org/Atlas/Tama%F1oFinal/Automolus rubiginosus.jpg). However, the southern slopes of the mountains (large parts of which have been converted for coffee farming) have been subject to very little ornithological investigation to date. I found the species widespread but uncommon on the San Lorenzo

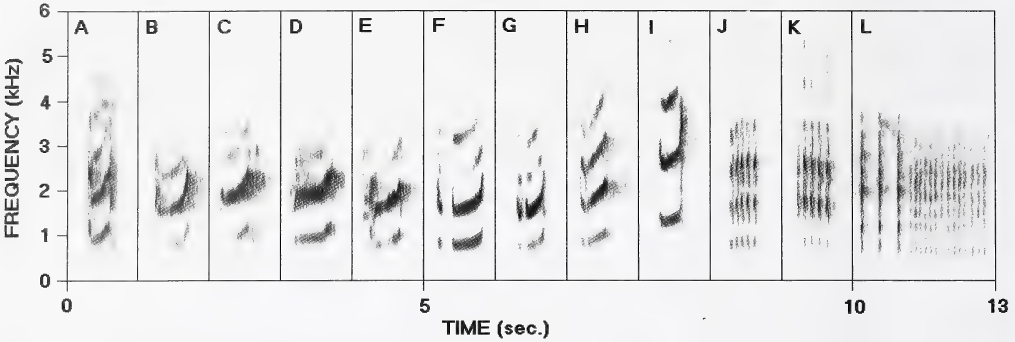

Figure 2. Songs of 12 taxa of foliage-gleaners. A–J ten different subspecies of *Automolus rubiginosus*: A: *rubiginosus* (Oaxaca, Mexico; P. Boesman). B: *veraepacis* (Chiapas, Mexico; P. Boesman). C: *saturatus* (Darien, Panama; L. R. Macaulay). D: *nigricauda* (Pichincha, Ecuador; N. Athanas). E: *sasaimae* (Boyacá, Colombia; O. Laverde). F: *obscurus* (Surinam; O. Ottema). G: *brunnescens* (Zamora-Chinchipe, Ecuador; N. Krabbe). H: *watkinsi* (Pando, Bolivia; T. S. Schulenberg). I: possibly the unnamed taxon referred to by Remsen (2003) (Amazonas, Brazil; C. A. Marantz). J: *rufipectus* (Magdalena, Colombia; N. Krabbe). K: *Hylocryptus erythrocephalus* (Loja, Ecuador; N. Krabbe). L: *Hylocryptus rectirostris* (Minais Gerais, Brazil; H. G. Remold).

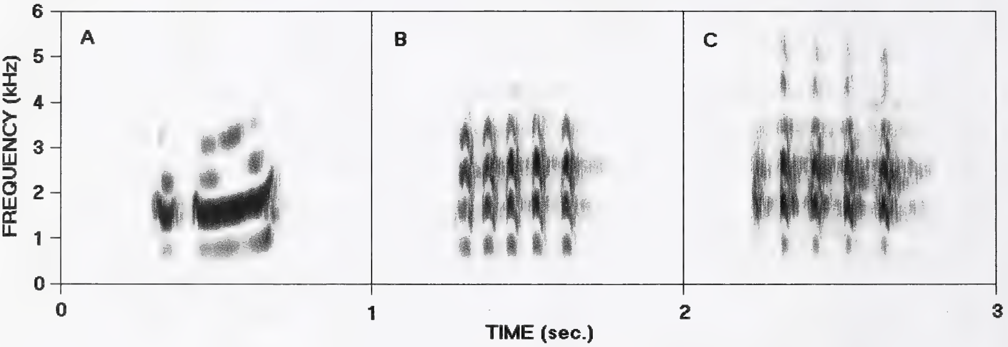

Figure 3. Songs of three foliage-gleaners. A: *Automolus rubiginosus brunnescens*. B: *A. r. rufipectus*. C: *Hylocryptus erythrocephalus*. Same as Fig. 2G, J and K, but with a different time scale.

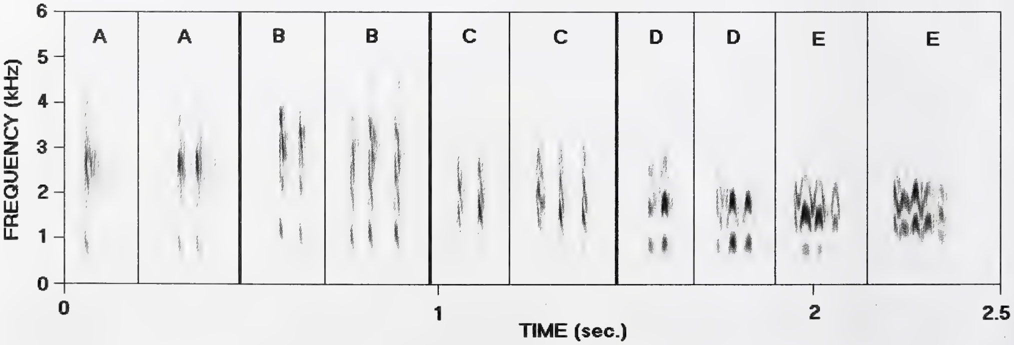

Figure 4. Calls of four taxa of foliage-gleaners. A: *Automolus rubiginosus brunnescens* (Napo, Ecuador; N. Krabbe). B: *A. r. nigricauda* (Esmeraldas, Ecuador; O. Jahn). C: *Hylocryptus erythrocephalus* (Piura, Peru; H. van Oosten). D–E: *Automolus rubiginosus rufipectus* (Magdalena, Colombia; N. Krabbe), D foraging calls, E alarm-calls. Note time scale.

ridge, apparently occurring wherever there was available habitat. The two closest territories found were *c.*200 m apart. Todd & Carriker (1922) noted 'It was perhaps most numerous at Pueblo Viejo in the thick scrub, but cannot be considered a common bird anywhere'. Large areas around Pueblo Viejo have been denuded by burning, but considerable expanses of forest and scrub occur between Pueblo Viejo and the San Lorenzo ridge. In view of the species' tolerance of disturbed habitats, there seems to be no grounds for considering it immediately threatened. It is probably best given the IUCN status of Near Threatened, approaching the status of Vulnerable (criteria B1(b), B2(b) and C1). To my knowledge, only a small part of its range is effectively protected (the 'El Dorado' reserve on the San Lorenzo ridge). The Sierra Nevada de Santa Marta National Park only includes higher elevations in this part of the mountains, and nearby Tayrona National Park only elevations below the range of *rufipectus*.

Discussion

A detailed study and analysis may reveal the small differences between songs of some of the other subspecies of *Automolus rubiginosus* to be constant and perhaps sufficiently different for species recognition (see Remsen 2003), were they ever to come into contact. However, their close similarity to each other suggests that they likely form a monophyletic unit. In contrast, lesser vocal differences between *A. rufipectus* and *H. erythrocephalus* suggest that *A. rufipectus* may not be a close relative of its proposed congeners and conspecifics. The habitat of *rufipectus* is distinctly drier than those of other forms referred to *A. rubiginosus*. However, in absence of a study of molecular or other characters, convergent evolution cannot be ruled out.

Independent of whether *rufipectus* is a close or distant relative of other taxa currently placed in *A. rubiginosus*, the dramatic vocal differences demonstrate that *rufipectus* merits species recognition. The two sympatric species *A. infuscatus* and *rufipileatus* differ in fewer vocal variables (Fig. 5a–c), indicating that even small vocal differences may be sufficient for species recognition in foliage-gleaners. I therefore recommend that species rank be restituted for *rufipectus*. Santa Marta Foliage-gleaner (rather than Rufous-chested Automolus as employed by Cory & Hellmayr 1925) might be an appropriate vernacular name.

Vocalisations of the other six species referred to *Automolus* (Figs. 5a–g, 6a–c, 7a) are highly diverse and do not, in general, offer clues as to relationships among species. Only songs of *infuscatus* and *rufipileatus* (Fig. 5a–c) bear sufficient resemblance to each other that they could be confused by experienced field ornithologists.

Inter-relationships among the ten presently recognised genera of foliage-gleaners and allies are unclear, and several genera are so poorly defined that the the only solution to avoid problems in defining them morphologically would be to merge them all (Remsen 2003). In relation to other furnariids, the multiple-gene molecular studies by Irestedt *et al.* (2006; unpubl. data) provide strong evidence that foliage-gleaners and allies (including *Megaxenops* and *Heliobletus*) form a monophyletic unit; within the foliage-gleaner assembly these authors found two clades, one comprising *Automolus/Hyloctistes*, *Hylocryptus/Clibanornis* and *Thripadectes*, and the other consisting of *Philydor*, *Syndactyla*, *Anabacerthia*, *Heliobletus* and *Megaxenops*.

Genus *Hylocryptus* was erected for *erythrocephalus* when that species was described by Chapman (1919), mainly on the basis of its long, straight bill. Hellmayr (*in* Cory & Hellmayr 1925) left *rectirostris* in *Automolus*, but noted that its juvenile plumage and certain structural characters suggest affinities with *erythrocephalus*. Despite the widely disjunct distributions of the two species, Zimmer (1936) had 'no hesitation' in assigning *rectirostris* to *Hylocryptus*, partly because of its similar general colour pattern to *erythrocephalus*, but primarily because its bill, though shorter, approaches that of *erythrocephalus* in length and shape. Zimmer's treatment has been followed by all subsequent authors. Songs of the two

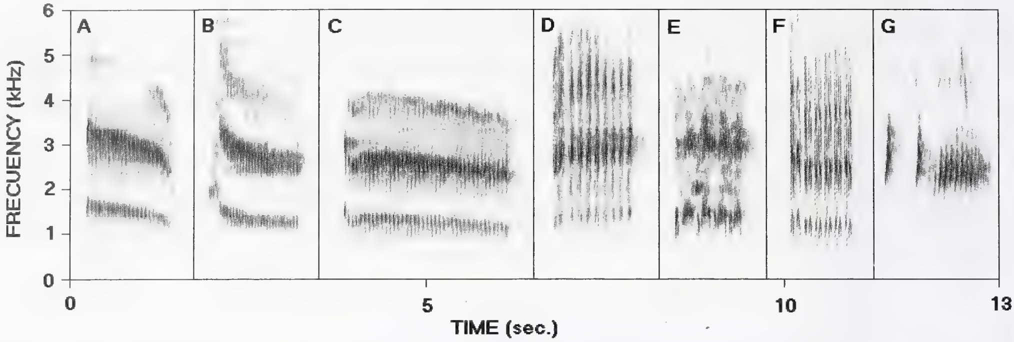

Figure 5. Songs of different *Automolus* foliage-gleaners. A: *A. rufipileatus consobrinus* (Sucumbíos, Ecuador; J. V. Moore). B: *A. infuscatus badius* (Amazonas, Venezuela; C. Parrish). C: *A. i. turdinus* (Orellana, Ecuador; R. S. Ridgely). D: *A. paraensis* (Mato Grosso, Brazil; C. A. Marantz). E: *A. leucophthalmus lammi* (Alagoas, Brazil; C. A. Marantz). F: *A. l. sulphurascens* (Rio de Janeiro, Brazil; L. P. Gonzaga). G: *A. melanopezus* (Orellana, Ecuador; R. S. Ridgely).

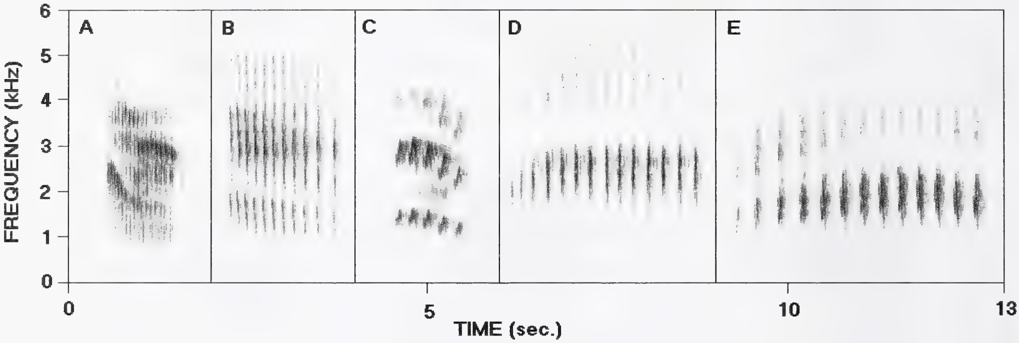

Figure 6. Songs of different *Automolus* and *Anabazenops* foliage-gleaners. A: *Automolus ochrolaemus cervinigularis* (Veracruz, Mexico; L. Irby Davis). B: *Automolus o. exsertus* (Costa Rica; L. Irby Davis). C: *Automolus o. turdinus* (Sucumbíos, Ecuador; P. Coopmans). D: *Anabazenops fuscus* (Rio de Janeiro, Brazil; T. A. Parker). E: *Anabazenops dorsalis* (Mato Grosso, Brazil; M. D. Medler).

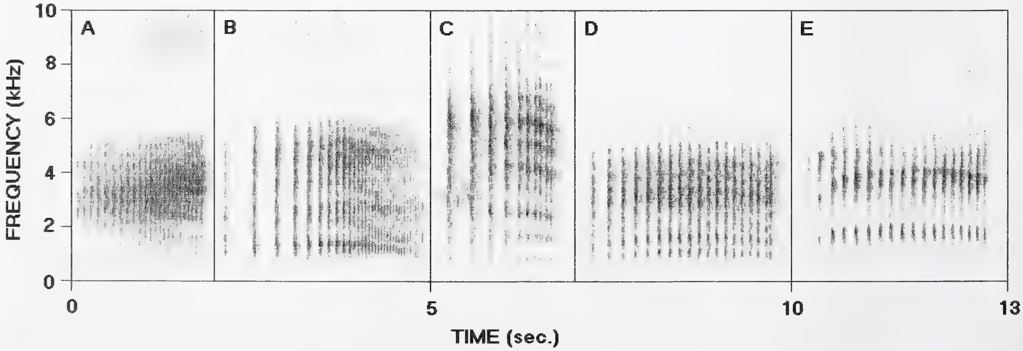

Figure 7. Songs of different *Automolus* and *Syndactyla* foliage-gleaners. A: *A. r. roraimae* (Bolívar, Venezuela; M. Van Beirs) (species removed to *Syndactyla* by Zimmer *et al.* 2008). B: *S. ruficollis* (Loja, Ecuador; N. Krabbe). C: *S. subalaris mentalis* (Napo, Ecuador; M. Lysinger). D: *S. g. guttulatus* (Aragua, Venezuela; C. A. Marantz). E: *S. rufosuperciliata cabanisi* (Zamora-Chinchipe, Ecuador; N. Krabbe). For sonograms of *S. dimidiata* see Robbins & Zimmer (2005). Note frequency scale.

species have rather different patterns, but show some similarity in pitch and quality (Fig. 2k–l).

The resemblance of the song of *rufipectus* to that of the much longer and straighter billed *Hylocryptus erythrocephalus* (Figs. 2j–k, 3b–c) might be coincidental, as perhaps also suggested by their different calls (Fig. 4c–e), but is so striking, that the possibility that they are sister taxa demands consideration. Were such a relationship confirmed, it would add to the already interesting evolutionary and biogeographic history of the genus *Hylocryptus* (which would comprise three relictual species with disjunct distributions in widely separated dry-forest areas of the Neotropics). It would also show that songs of foliage-gleaners, even in relatively small populations, may remain unchanged for extended periods of time, and would call for additional caution when using bill shape as a taxonomic character in this group. A similar case of vocal resemblance in song between forms whose morphologies do not suggest that they are closely related has been reported between the fairly straight-mandibled (and rather uniform) *Automolus roraimae* (Fig. 7a) and the distinctly recurve-mandibled (and more or less streaked) members of the genus *Syndactyla* (Fig. 7b–e) (see also Hilty 2003, Robbins & Zimmer 2005, Zimmer *et al*. 2008). In view of the highly disputed merging of many foliage-gleaner genera by Vaurie (1980) (see Remsen 2003, Robbins & Zimmer 2005) and the conflicting indications of morphological and vocal data as to the relations of the taxon *rufipectus*, I would propose awaiting the results of a molecular study before making a generic change for this foliage-gleaner.

The Sierra Nevada de Santa Marta is an isolated massif in northern Colombia with an area of *c*.5,900 km^2. With no fewer than 70 endemic bird taxa, it is perhaps the most diverse smaller centre of terrestrial endemism in the world. Most of the endemic taxa are derived from Andean forms (Todd & Carriker 1922), and their many different levels of differentiation suggest that multiple colonisations have occurred. Seventeen are presently ranked as species by Remsen *et al*. (2007). Many of these species are in groups with colourful plumage, whilst many suboscines remain ranked only as subspecies. It therefore comes as no great surprise that *A. rufipectus* is better ranked as a biological species. Preliminary analyses of vocalisations suggest that species rank is likely to be appropriate for several other taxa endemic to the Santa Marta mountains, such as *Trogon personatus sanctaemartae*, *Lepidocolaptes lacrymiger sanctaemartae*, *Grallaria rufula spatiator*, *Henicorhina leucophrys anachoreta*, *Arremon torquatus basilicus* (already shown to be genetically distinct by Cadena 2006, Cadena *et al*. 2007), and possibly others.

Acknowledgements
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APPENDIX

Songs examined. Abbreviations used are: XC = Xeno-canto website at www.xeno-canto.org; LNS = Macaulay Library of Natural Sounds, Cornell, website at www.animalbehaviorarchive.org/loginPublic.do. Recordings known to be given by an individual already represented, were avoided or counted as one.

Automolus rubiginosus: *A. r. rubiginosus* 6 (Boesman 2007; LNS 89684, 95077, 127210, 127230, 127246, 127247, 127271); *A. r. veraepacis* 3 (Boesman 2007; XC 11012, 14140); *A. r. saturatus* 1 (LNS 108866); *A. r. nigricauda* 9 (Jahn *et al.* 2002, Krabbe & Nilsson 2003; XC 5576, 6598, 8000, 8308 (call), 13139); *A. r. sasaimae* 1 (XC 12728, 12729, 12731); *A. r. obscurus* 1 (XC 7520); *A. r. brunnescens* 4 (Krabbe & Nilsson 2003; XC 6575; also an unpubl. recording of calls by N. Krabbe); *A. r. watkinsi* 1 (Schulenberg *et al.* 2000); *A. r.* ssp. nov.: 1 (LNS 117196, 117197).

Automolus rufipectus: 6 (Boesman 1999; Strewe *et al.* 2003; also songs of four individuals and calls of one recorded during the present study).

Automolus roraimae: 3 (Boesman 2007).

Automolus ochrolaemus: *A. o. cervinigularis* 5 (LNS 7009, 7011, 7012, 102599; XC 14133); *A. o. hypophaeus* 2 (LNS 7012; XC 11011); *A. o. exsertus* 1 (LNS 7013); *A. o. pallidigularis* 11 (Jahn *et al.* 2002, Krabbe & Nilsson 2003; LNS 7014, 82449; XC 1490, 12898); *A. o. turdinus* 12 (Krabbe & Nilsson 2003, Moore 1993; XC 6094, 8704; also 7 unpubl. recordings from Ecuador by P. Coopmans and J. V. Moore); *A. o. ochrolaemus* 5 (LNS 39003; XC 85, 8361, 8538, 13424); *A. o. auricularis* 4 (LNS 88948; XC 9540, 9541, 14773).

Automolus infuscatus: *A. i. infuscatus* 15 (Boesman 2007, Krabbe & Nilsson 2003, Moore 1993; XC 3434, 10324; LNS 53363, 53377, 110437; also 4 unpubl. recordings from Ecuador by P. Coopmans, M. Lysinger, J. V. Moore and R. S. Ridgely); *A. i. badius* 4 (Boesman 2007; LNS 117037; XC 6229).

Automolus paraensis (see Zimmer 2002): 11 (LNS 88849, 88900, 88950, 89066, 89067, 106198, 110005, 113065, 115019, 115233, 115237).

Automolus leucophthalmus: *A. l. lammi* 3 (LNS 127914, 127950, 127992); *A. l. sulphurascens* 10 (Gonzaga & Castiglioni 2001; LNS 19082, 19086, 19214, 113312, 113394, 113395, 115354, 115426, 115429).

Automolus rufipileatus: *A. r. consobrinus* 22 (Krabbe & Nilsson 2003, Moore 1996; LNS 115874, 119700, 110635, 106422, 110523, 129499, 129534; XC 222, 3206, 6409, 9926, 13425; also 4 unpubl. recordings from Ecuador by J. V. Moore and R. S. Ridgely); *A. r. rufipileatus* 8 (LNS 88386, 88462, 88522, 88634, 88668, 106104, 10630, 109948).

Automolus melanopezus: 13 (Krabbe & Nilsson 2003; LNS 26565, 38862, 38865, 38885, 38914; XC 12027; Moore 1993; also 5 unpubl. recordings from Ecuador by P. Coopmans, M. Lysinger, J. V. Moore and R. S. Ridgely).

Hylocryptus erythrocephalus: 11 (Coopmans *et al.* 2004, Krabbe & Nilsson 2003; LNS 122729; XC 4152, 4191, 8306, 8308 (call), 8727, 14414).

Hylocryptus rectirostris: 2 (LNS 114856; XC 11924).

Anabazenops fuscus: 8 (Gonzaga & Castiglioni 2001; LNS 39082, 103868, 112723; XC 4861, 4862, 5468, 14680).

Anabazenops dorsalis: 8 (LNS 88418, 106182, 106092, 106175, 106200, 109946; XC 6574, 11902).

Syndactyla guttulata: *S. g. guttulata* 6 (Boesman 2007; LNS 127816, 127819).

Syndactyla ruficollis: 6 (Coopmans *et al.* 2004, Krabbe & Nilsson 2003).

Syndactyla rufosuperciliata: *S. r. rufosuperciliata* 2 (Gonzaga & Castiglioni 2001; LNS 108238); *S. r. acrita* 2 (LNS 19094; XC 8195); *S. r. oleaginea* 1 (Krabbe *et al.* 2001); *S. r. cabanisi* 3 (Lysinger *et al.* 2005, Krabbe & Nilsson 2003).

Syndactyla subalaris: *S. s. mentalis* 3 (Moore & Lysinger 1997, Krabbe & Nilsson 2003); *S. s. subalaris* 3 (Krabbe & Nilsson 2003).

A reassessment of the fossil goose *Anser scaldii* Lambrecht, 1933

by Trevor H. Worthy, Storrs L. Olson & Thierry Smith

Received 27 November 2007

The name *Anser scaldii* was first used by Van Beneden (1872) in a brief text that read 'Nous avons recu un humérus dans un parfait état de conservation, trouvé dans le crag, à Anvers'. The name was also used by Van Beneden (1873), but in both instances it is a *nomen nudum*. The name was made valid for the purposes of nomenclature by Lambrecht (1933: 368) when he entered *Anser scaldii* Van Beneden, 1872, with the following description and information: 'Humerus typisch anserin, von der Größe von *Tadorna casarca*. Länge 129 mm. Material: Humerus im Mus. Bruxelles. Alter und Fundort: Obermiozän (Bolderian), Antwerpen. Etymologie: Artname nach der Schelde: Scaldia.' At the same time he mistakenly gave the original combination as *Anas scaldii* Van Beneden 1872, which error was perpetuated by Gaillard (1939), Brodkorb (1964), Howard (1964), and Bochenski (1997), as noted by Mlíkovský (2002: 125).

The statement by Lambrecht that this fossil is of similar length to humeri of *Tadorna* prompted Worthy *et al.* (2007) to suggest that *Anser scaldii* may have a bearing on the evolution of Tadornini in Europe. Accordingly, we re-examined the holotype in the Department of Paleontology, Royal Belgian Institute of Natural Sciences, Brussels, Belgium, to ascertain its relationships and its significance in Anseriform evolution.

Abbreviations

Institutions—ANWC, Australian National Wildlife Collection, CSIRO Sustainable Ecosystems, Canberra, ACT, Australia; BMNH, Natural History Museum, London, UK; CM, Canterbury Museum, Christchurch, New Zealand; IRSNB, Département de Paléontologie, Institut royal des Sciences naturelles de Belgique, Brussels, Belgium; MNZ, Museum of New Zealand Te Papa Tongarewa, Wellington, New Zealand (formerly National Museum of New Zealand, Dominion Museum, and Colonial Museum); MV, Museum Victoria, Melbourne, Australia; SAM, South Australia Museum, Adelaide; SMF, Forschungsinstitut Senckenberg, Frankfurt-am-Main, Germany; USNM, National Museum of Natural History, Smithsonian Institution, Washington, DC, USA.

Materials and Methods

A cast was made of the fossil by R. Smith of the Royal Belgian Institute of Natural Sciences and provided to THW for study in Australia. Comparisons were made with recent skeletons of a wide range of waterfowl taxa in the SAM. Additional observations were made on specimens from the collections of ANWC, CM, MV, MNZ and USNM. Measurements were made with dial callipers and rounded to 0.1 mm. Anatomical nomenclature of specific bone landmarks follows Baumel & Witmer (1993) with English translations, or names follow Howard (1929), thereafter.

Comparative material used in this study.—*Tadorna tadornoides* (Jardine & Selby, 1828), Australian Shelduck: SAM B39873, female; SAM B39591, male. *T. variegata* (J. F. Gmelin, 1789), Paradise Shelduck: MNZ 25139, 25669. *T. ferruginea* (Pallas, 1764), Ruddy Shelduck: SAM B.38602. *T. tadorna* (Linnaeus, 1758), Common Shelduck: MNZ 12280; MV B25679;

ANWC 22408, male. *T. radjah* (Lesson, 1828), Radjah Shelduck: MNZ 26206, 26207; ANWC 22411, male. *Alopochen aegyptiaca* (Linnaeus, 1766), Egyptian Goose: ANWC 22239, male; BMNH 1930.3.24.217, unsexed; MNZ 24283; MV B25678. *Chloephaga picta* (J. F. Gmelin, 1789), Upland Goose: BMNH 1860.11.4.15. *C. poliocephala* P. L. Sclater, 1857, Ashy-headed Goose: MV B13714, female. *C. hybrida* (Molina, 1782), Kelp Goose: MV B13227, male. *Branta canadensis* (Linnaeus, 1758), Canada Goose: MNZ 23745, 26738–41; SAM B31086; MV B6364, male. *B. bernicla* (Linnaeus, 1758), Brent Goose, MV B5156; eastern USA, five males: USNM 561418, 501611, 553108, 500361, 492443; five females: USNM 561415, 561417, 561016, 561416, 561028; Europe: SMF 452, 1940, 4394, 6562, female. *B. leucopsis* (Bechstein, 1803), Barnacle Goose: USNM 246190, 343808, 489420, SMF 619, SMF 6231, female. *Anser brachyrhynchus* Baillon, 1834, Pink-footed Goose: MV B25672. *A. caerulescens* (Linnaeus, 1758), Snow Goose: SAM B36868, female. *A. anser* (Linnaeus, 1758), Greylag Goose: MNZ 20812, 24519. *A. erythropus* Linnaeus, 1758, Lesser White-fronted Goose: IRSNB 22.431 (IG 18.059). *Cygnus atratus* (Latham, 1790), Black Swan: MNZ 15266, 15267, 17250; SAM B46110, male.

Results

Holotype.—IRSNB Av69, a right humerus, reassembled from three pieces, complete except for some erosion to the rim of the deltoid crest. The bone was separated at the re-assembly point for this investigation and it was determined to lack the infilled sediment of other fossil bones from the Bolderian, and instead had been filled with plaster. The bone appears relatively fresh and unmineralised.

Measurements.—Length 129.7 mm, maximum proximal width from dorsal tubercle 27.2 mm, mid-shaft width 8.5 mm, maximum distal width 17.7 mm.

Locality.—Antwerp, Belgium; 'trouvé dans la nouvelle enceinte d'Anvers, deuxième section, en Avril 1864' (Van Beneden 1873: 372).

Stratigraphy/Age.—Dollo (1909) listed *A. scaldii* in the fauna of the marine sands of the local Bolderian Stage, then assumed to be Upper Miocene but now considered to be early to middle Miocene (Louwye *et al*. 2000, Laga *et al*. 2001). Brodkorb (1964) modified this to the 'Anversian black sands'. Fossils from the different layers of the Bolderian regional stage in the Anvers area are always dark grey to black (M. Bosselaers pers. comm. to TS). Because IRSNB Av69 is pale brownish, and lacks typical infilled sediment, it is probably not derived from the Bolderian and is more likely from overlying Pleistocene-Holocene deposits, which is supported by the fact that the specimen is indistinguishable from a living species.

Systematic palaeontology

Family ANATIDAE Leach, 1820: Swans, geese, ducks

Subfamily ANSERINAE Leach, 1820: Geese and swans

We retain *A. scaldii* in Anserinae because it possesses the following unique combination of characters: (1) similar proportions, particularly to the smaller *Anser* and *Branta* species; (2) the caudal facies extends as a lamina around the distoventral margin of the *fossa pneumotricipitalis ventralis* (ventral pneumotricipital fossa), partially occluding the fossa and this lamina remains elevated from the base of the fossa and extends under the *tuber. ventralis* (ventral tubercle); (3) the *crista deltopectoralis* (deltoid crest) is concave dorsally and is elongate, extending 37% of its length further distally than the *crista bicipitalis* (bicipital crest); (4) the *tuberculum dorsale* (dorsal tubercle) is elevated above the shaft; (5) there is a prominent capital shaft ridge; (6) the ventral pneumotricipital fossa is highly pneumatic; (7) the ventral tubercle is directed proximally; (8) in cranial view the *capital incisura* (capital groove) forms a very shallow notch in the proximal profile; and (9) in caudal view the ventral margin from the ventral tubercle around the bicipital crest is evenly convex.

The humeri of Anhimidae and Anseranatidae differ markedly as follows: capital shaft ridge strongly directed towards the head; dorsal pneumotricipital fossa obsolete; lamina around the distoventral margin of the ventral pneumatic fossa (character 2) larger, partially occluding the fossa; ventral pneumatic fossa comparatively smaller; distal extent of entepicondyle less than dorsal condyle; distinct dorsal supracondylar prominence; and external tricipital groove lacking. The humeri of *Dendrocygna* differ markedly in having a prominent capital shaft ridge directed towards the head and a prominent dorsal supracondylar prominence. The pneumatic ventral pneumotricipital fossa distinguishes *A. scaldii* from the non-pneumatic state in *Thalassornis*, *Oxyura*, *Biziura*, *Malacorhynchus*, some Mergini e.g. *Somateria*, *Melanitta*, *Clangula*, *Bucephala*, and some Aythyini. The Tadornini, although having similar proportions, differ in character 2, with the distoventral lamina merging with the floor in the ventral half of the ventral pneumatic fossa. Tadornini further differ in the configuration of the ventral margin of the bicipital crest. In *A. scaldii* this is evenly convex and extends ventrally of the ventral tubercle, as in Anserini, but in Tadornini (*Tadorna*, *Alopochen*, *Cyanochen*) the ventral tubercle is more prominent ventrally, so that when the humerus is viewed in a proximo-caudal direction, the ventral margin either forms a straight edge parallel to the capital shaft ridge, or it has a shallow notch distal of the ventral tubercle. Presence of a capital shaft ridge, elevated dorsal tubercle, and the dorsally concave deltoid crest, as in Anserini and Tadornini, are all plesiomorphic states relative to those seen in Anatini (no ridge, tubercle not elevated, deltoid crest flat or convex dorsally). Also, all Anatini possess a marked notch formed by the capital groove in the profile of the proximal end.

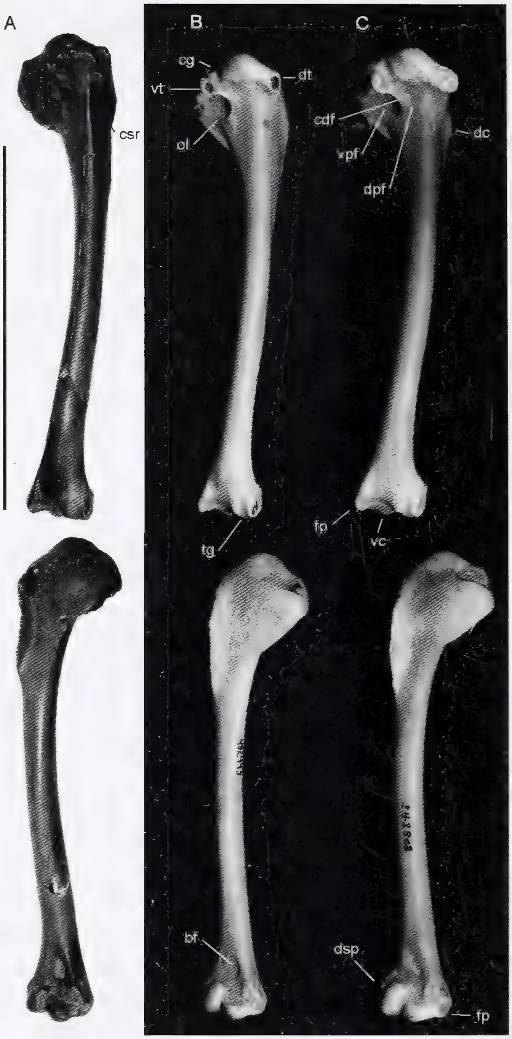

Figure 1. Humeri in caudal view. A. *Anser scaldii* IRSNB Av69; B. *Branta bernicla* USNM 492443; C. *B. leucopsis* USNM 343808. The figured *B. bernicla* humerus is the largest specimen in USNM and that of *B. leucopsis* the smallest, showing the near size continuum of these taxa. *B. leucopsis* is from a zoo bird and has a little pathological deformation notably of the dorsal tubercle. *Anatomical abbreviations*.—bc, bicipital crest; bf, brachial fossa; cdf, crus dorsale fossa (median crest); cg, capital groove; csr, capital shaft ridge; dc, deltoid crest; dpf, dorsal pneumotricipital fossa; dsp, dorsal supracondylar prominence; dt, dorsal tubercle; fp, flexor process; ol, osseus lamina; tg, scapulotricipital groove; vc, ventral condyle; vpf, ventral pneumotricipital fossa; vt, ventral tubercle. Scale bar = 10 cm.

Genus *Branta* Scopoli, 1769

Amongst Anserinae, *A. scaldii* is referred to *Branta* by the following characters. Swans (Cygnini) have much more elongate humeri. Amongst osteological characters, most obvious is the orientation of the capital shaft ridge towards the ventral side of the dorsal tubercle, a derived feature relative to most Anserinae (*Cygnus*, *Anser*), in which the capital shaft ridge is directed towards the head. In *Anser*, the ridge intercepts the middle of a line connecting the distal end of the median crest and the dorsal tubercle, whereas in *A. scaldii* and *Branta*, the ridge passes dorsal to the midpoint of such a line. Thus, in *Branta* the dorsal pneumotricipital fossa is relatively wider. Moreover, as the capital ridge passes towards the head in *Anser*, it forms the ventral side of a distinct groove between itself and the dorsal tubercle: the orientation of the capital ridge towards the immediate ventral side of the dorsal tubercle prohibits such a groove in *Branta*. In *A. scaldii*, the external tricipital groove is present caudally and extends around the distal end as a shallow groove, much like that in *Branta*. The external tricipital groove is present caudally but does not continue around the distal end in *Anser*. *A. scaldii* has a small, indistinct, separate dorsal supracondylar prominence distinct from the dorsal epicondyle. In most Anserinae this is prominent, but is small in *A. caerulescens*, *Branta bernicla* and *B. canadensis*. *A. scaldii* possesses an elongate entepicondyle (flexor process), unlike in *Cygnus* and *B. canadensis* where the entepicondyle has less distal extent than the dorsal condyle. But in other Anserinae, notably smaller taxa such as *Branta bernicla*, *Anser erythropus* and *A. caerulescens*, the entepicondyle has similar distal extent to the dorsal condyle as in *A. scaldii*.

In northern Europe, the species of *Branta* most similar to *A. scaldii* are *B. bernicla* and *B. leucopsis*, both of which overwinter in countries around the southern North Sea, including Belgium (Kear 2005). *B. leucopsis* is the larger (Kear 2005), which is reflected in measurements of humeri (Table 1). Humeri of *B. leucopsis* have significantly more robust proximal and distal ends than *B. bernicla* (t-Test assuming unequal variances: PW, t-Statistic = 3.87107, P(T<=t) two-tail = 0.012, t Critical two-tail = 2.570; DW, t-Statistic = 2.9359, P(T<=t) two-tail = 0.032, t Critical two-tail = 2.570582). As the length ranges of these two species in the small available samples nearly abut, the value for *A. scaldii* could fall in the expected range of either taxon, and the value for SW meets this expectation. The values for PW and DW are within the range of *B. bernicla* and outside that of *B. leucopsis*; importantly relative DW of the two species does not overlap and that for *A. scaldii* falls within that of *B. bernicla*. These observations support referring *A. scaldii* to *B. bernicla*, albeit a large individual, rather than *B. leucopsis*.

TABLE 1

Measurements (mm) for *Branta leucopsis* and *B. bernicla*: data given as mean (range), standard deviation. Specimens measured listed in Methods. DW%L is width of distal; width as percentage of length. PW includes deltoid crest.

	Length	Max. PW	SW	Max. DW	DW%L
B. leucopsis (*n*=5)	132.6 (129.6–139.2), 3.90	29.8 (28.0–32.0), 1.90	8.8 (8.3–9.6), 0.59	19.6 (18.7–20.5), 0.82	14.7 (14.3–15.4), 0.54
B. bernicla (*n*=15)	118.9 (111.8–128.2), 5.76	26.3 (24.1–27.9), 1.10	7.8 (7.1–8.6), 0.45	16.6 (15.6–17.9), 0.67	14.0 (13.2–14.3), 0.34
Anser scaldii	129.7	27.2	8.5	17.7	13.6

We therefore synonymise *A. scaldii* Lambrecht, 1933 with *B. bernicla* (Linnaeus, 1758) as follows:

Branta bernicla (Linnaeus, 1758)
Anser scaldii Van Beneden, 1872: 288—*nomen nudum*
Anser Scaldii Van Beneden, 1873: 372—*nomen nudum*
Anser scaldii 'Van Beneden, 1873': Dollo 1909: 19: 116—*nomen nudum*
Anser scaldii '(Van Beneden, 1872)' Lambrecht 1933: 368—new synonymy
Anser Scaldii '(van Beneden)': Gaillard 1939: 78.
Anser scaldii '(Van Beneden, 1872)': Brodkorb 1964: 212; Howard 1964: 267
Anser scaldii '(Van Beneden, 1871)': Bochenski 1997: 40, 304
Anser scaldii Lambrecht: Mlíkovský 2002: 125

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New distributional records of birds from western Ecuador, and comments on the avifauna of Isla de La Plata

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Distribution of birds in Ecuador is fairly well documented based on more than a century of collections and field research recently summarised by Ridgely & Greenfield (2001), which facilitated the identification of 107 Important Bird Areas (IBAs) in the country (Freile & Santander 2005). New distributional records are published with regularity as new areas are explored or bird lists are compiled as a result of intensive field work. Here I present new records of birds from the western lowlands, based on visits to deciduous and semi-deciduous forests and wetlands of the Tumbesian Endemic Bird Area (Stattersfield *et al.* 1998). I also document new breeding records for Isla de la Plata (see Cisneros-Heredia 2005) and briefly discuss the dynamics of avian colonisation and breeding on this small continental island. I follow Ridgely & Greenfield (2001) for systematics and BirdLife International

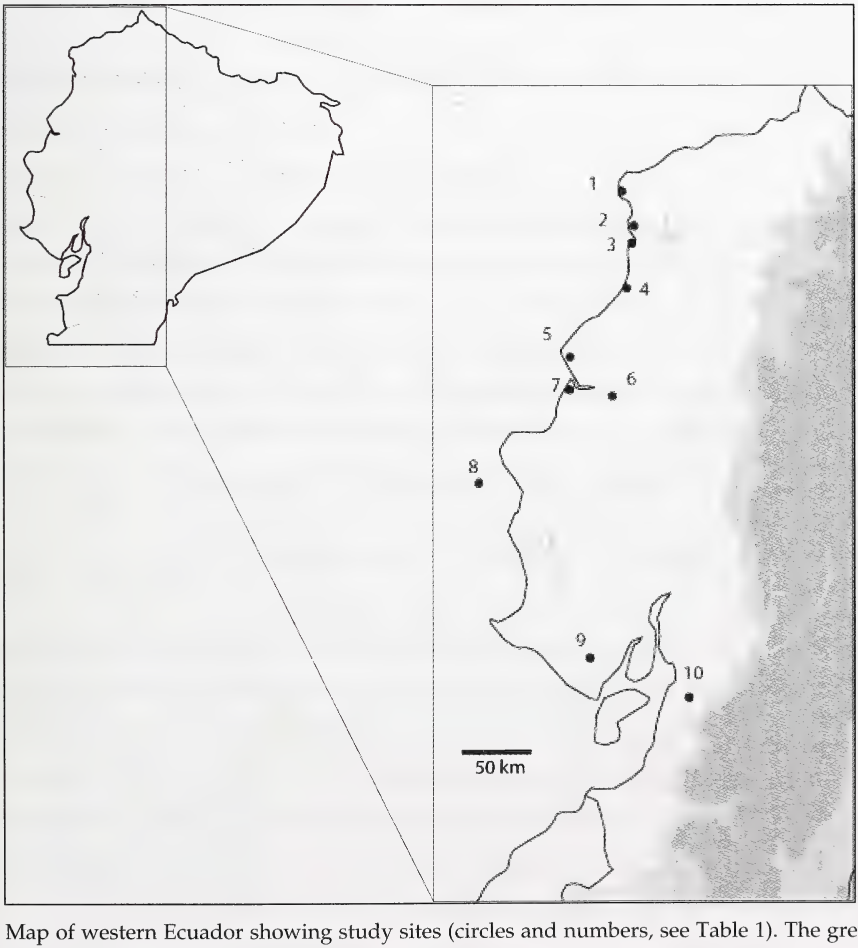

Figure 1. Map of western Ecuador showing study sites (circles and numbers, see Table 1). The grey-shaded area represents land above 600 m.

TABLE 1

Localities in western Ecuador where bird species herein reported were recorded.

Site, province	Coordinates	Elevation	Habitat	Survey dates
1) Reserva Integral Montecaimito, south-west Esmeraldas	00°42′N, 80°05′W	0–50 m	humid hill forest, secondary woodland, coastal scrub	4–7 and 27–31 December 2004
2) Mompiche, Esmeraldas	00°28′N, 80°00′W	sea level	humid secondary forest, coastal scrub, young mangrove	24–27 March 2005
3) Cojimíes estuary, Manabí	00°21′N, 80°01′W	sea level	mangrove, muddy banks, beaches	29 July 2006
4) Chorrera, Manabí	00°03′N, 80°03′W	sea level	coastal estuary	28 July 2006
5) Finca Integral Río Muchacho, 20 km north of Bahía de Caráquez, Manabí	00°25′S, 80°26′W	30 m	semi-deciduous forest and woodland	8–12 September 2005; 8–12 February 2006
6) Reserva Cerro Seco, Bahía de Caráquez, Manabí	00°35′S, 80°25′W	0–30 m	deciduous forest and scrub	30 October–2 November 2004
7) Humedal La Segua, Manabí	00°41′S, 80°09′W	10 m	freshwater marshland	3 March 2007
8) Isla de La Plata, Manabí	01°16′S, 81°03′W	0–150 m	coastal scrub, woodland, shrubby open land	5–9 February 2008
9) Refugio de Vida Silvestre Parque Lago, Guayas	02°31′S, 80°04′W	5 m	dry scrub, artificial wetland	29–31 August 2005
10) El Aromo, 8 km east of Naranjal, Guayas	02°43′S, 79°38′W	200 m	humid foothill secondary forest and borders	26–28 August 2005

(2008) for conservation status (IUCN threatened categories are indicated following the scientific name).

Study sites

Field work was undertaken from December 2004 through February 2008 at ten localities in Esmeraldas, Manabí, Guayas and the recently created Santa Elena provinces (Table 1, Fig. 1). Field work consisted primarily of 3–4 days of intensive observations in each area, using playback to elicit rapid responses from key species. Single days of intensive observations were made at sites 3, 4 and 7 and six mist-nets were opened at sites 1, 5 and 6 during two days (=12 sampling hours/site). Observations at Isla de La Plata were made during five intensive days totalling nearly 40 observation hours throughout 'inland' habitats.

New records and range extensions

PALE-BROWED TINAMOU *Crypturellus transfasciatus*

Natural vocalisations and responses to playback were regularly heard and tape-recorded in secondary forest at Cerro Seco (November 2004) and in secondary forest, woodland and agricultural fields at Río Muchacho (September 2005 and February 2006). Dry forest at Cerro Seco is dominated by young second growth with a few *Ceiba* trees, whilst forests at Río Muchacho are more extensive, with taller remnant trees and dense understorey, and agricultural areas are interspersed with woodland and small patches of remnant scrub. At least three also heard in secondary forest patches and scrub around La Villega lagoon (00°03′N, 80°02′W), 5 km east of Pedernales, prov. Manabí (July 2006). Previously known north to the Bahía de Caráquez region (Ridgely & Greenfield 2001), but recent records from, e.g. Río Muchacho, La Villega and Reserva Lalo Loor (pers. obs. April 2008), have extended its range north to the Pedernales area (Ridgely & Greenfield 2006).

NORTHERN SHOVELER *Anas clypeata*

A male was seen briefly with a group of 35 Blue-winged Teals *Anas discors* on open water near floating vegetation, and subsequently was observed in flight amongst a flock of *c*.235 *A. discors*, at La Segua wetland on 3 March 2007, using a telescope. It was identified by its green head contrasting markedly with the white foreparts, and massive bill, which pattern was noted both on the water and in flight, and is quite unlike that of other *Anas* in the area (*discors* and *bahamensis*). Its flight silhouette also differed from *A. discors* by its long neck and heavier body. Madge & Burn (1988) was consulted shortly after the observation. This is the second record of this boreal migrant in Ecuador, following one at Ecuasal, prov. Santa Elena (formerly Guayas) (Ridgely & Greenfield 2001). One was also observed by R. S. Ridgely, B. Haase, F. Sornoza and R. Quinn (R. S. Ridgely pers. comm.) at Humedales de Pacoa, prov. Santa Elena on 20 January 2007, which was perhaps the same individual moving north. Evidence (i.e. photographs, recordings or specimens) is still needed to document the species' occasional presence in Ecuador.

YELLOW-CROWNED NIGHT HERON *Nyctanassa violacea*

In March 2005 two were at a small estuary surrounded by young mangrove near Mompiche town. In waterbird censuses at La Chorrera and the Cojimíes estuary, 15 and 80 individuals were recorded, at least 50% of them juveniles (suggesting local breeding). There are few records north of the environs of Bahía de Caráquez (just two mentioned by Ridgely & Greenfield 2001, from prov. Esmeraldas). These records suggest a continuous distribution along the entire Ecuadorian coast (see Solano-Ugalde *et al*. submitted).

WOOD STORK *Mycteria americana*

A single soaring over abandoned shrimp ponds at Chorrera on 28 July 2006 eventually flew off south. One was also observed in February 2005 at the same wetland (T. Santander pers. comm.), and a few have also been observed there since then, always in flight (L. Madrid pers. comm.). Not previously recorded north of the río Chone. However, records at Pedernales might only represent vagrants from the Chone estuary.

RUFOUS-NECKED WOOD RAIL *Aramides axillaris*

Two singles in degraded mangrove at the Cojimíes estuary in July 2006, foraging on open mud then rapidly scurrying inside the mangrove. Ridgely & Greenfield (2001) already suggested that the species might be continuously distributed along the entire Ecuadorian coast (see Solano-Ugalde *et al*. submitted). Nevertheless, they knew of only one record from Esmeraldas (at Muisne mangroves) and none from Manabí. The extensive destruction of mangrove in Ecuador makes this and other mangrove-dwellers highly threatened (Hilgert & Benavides 2002).

ANDEAN COOT *Fulica ardesiaca*

One observed at close range with a telescope within a small flock of Common Gallinules *Gallinula chloropus* at La Segua in March 2007. The frontal shield was all white and extended towards the front. A previous observation at this site was mentioned by López-Lanús & Gastezzi (2000) but was regarded as unconfirmed due to the lack of evidence. Also recorded at La Segua in August 1995 (D. F. Cisneros-Heredia *in litt*. 2008) and November 2003 (R. Ahlman *in litt*. 2008).

AMERICAN GOLDEN PLOVER *Pluvialis dominica*

One observed for *c.*40 minutes at a small estuary north of Mompiche in March 2005. It was foraging with several Wilson's Plovers *Charadrius wilsonia*, Least *Calidris minutilla* and Spotted Sandpipers *Actitis macularius*, and Whimbrel *Numenius phaeopus*. The following features were noted: pale gold spots and stripes, a fairly conspicuous whitish superciliary contrasting with the duskier crown, and the lack of black axillaries (as in Grey Plover *P. squatarola*). Known from few sites in western Ecuador, primarily in the south, but could occur as a transient almost anywhere in the country (Ridgely & Greenfield 2001). I am unaware of any other records from provs. Manabí and Esmeraldas.

WILSON'S PLOVER *Charadrius wilsonia*

A flock of 5–6 was observed at the small estuary north of Mompiche in March 2005 (see previous species), repeatedly performing a hide-and-run behaviour when followed by the observer. Two were also observed foraging on mudflats at the Cojimíes estuary within a large flock of sandpipers, plovers and egrets in July 2006. The species' presence north the Chone estuary is not well documented but is probably continuous.

GULL-BILLED TERN *Sterna nilotica*

A total of 153 was counted at the Cojimíes estuary in July 2006. Groups of up to 40 were observed, mainly at shrimp ponds, but no direct evidence of breeding was noted. They were identified by the heavy and fairly short bill (compared to Sandwich Tern *S. sandvicensis* also present). Henry (2005) reported adults feeding dependent young, whilst a breeding colony was observed by D. F. Cisneros-Heredia (*in litt.* 2008) in April 2006, at Isla Jupiter, just south of Mompiche. Breeding is therefore confirmed for northern Manabí and southern Esmeraldas.

OCHRE-BELLIED DOVE *Leptotila ochraceiventris*

Several responded to playback in secondary forest at Río Muchacho in September 2005, but none was heard there in February 2006. There is an old record from central Manabí, c.10 km south of Río Muchacho (Ridgely & Greenfield 2001, 2006). Beyond the Chone estuary it probably extends to the Pedernales area, *c.*70 km to the north, but this requires confirmation.

CENTRAL AMERICAN SCREECH OWL *Otus* (*Megascops*) *centralis*

One heard on 6 December and two heard (one tape-recorded) on 28–30 December 2004 in secondary forest and forest borders at Reserva Integral Montecaimito, with two additional birds heard at Playa Coquito, *c.*5 km to the south, also in secondary woodland in March 2007. Forest at the latter has been regenerating over the last ten years, with some small forest corridors and secondary forest patches connecting to more extensive forest to the east. A recent record from Partidero-Poza Honda, 5 km south-southwest of Montecaimito (Benítez 2005) was based only on comments from local people. All previous records are from the Andean foothills (Ridgely & Greenfield 2001). It should be searched for in the nearby Mache-Chindul Mountains as other species of the Andean foothills and slopes have been recorded there (Carrasco *et al.* 2008), as well as in the forested hills of the Quingue–Caimito–Cabo San Francisco area to the west (see below).

WEST PERUVIAN SCREECH OWL *Otus* (*Megascops*) *roboratus*

At least six individuals responded to playback on 30 October–1 November 2004 in secondary forest and adjacent areas at Reserva Cerro Seco. Ridgely & Greenfield (2001) do not mention records from central Manabí. My record extends its distribution north to the Bahía de Caráquez region. Playback at Río Muchacho, *c.*20 km further north, failed to detect the species.

GREEN-CROWNED BRILLIANT *Heliodoxa jacula*
A female was mist-netted in primary forest, close to a forest border, at Reserva Montecaimito on 5 December 2004. The species was recently recorded in the nearby Mache-Chindul Mountains down to 300 m (Parker & Carr 1992) and at Partidero-Poza Honda, 5 km south-southwest of Montecaimito, at 150 m (Benítez 2005). My record extends the range of *H. jacula* further west, close to the coast and down to 100 m. It has been suggested that the presence of *H. jacula* in the lowlands is only seasonal (Ridgely & Greenfield 2001).

RUFOUS-TAILED JACAMAR *Galbula ruficauda*
One seen and heard in a secondary forest fragment at Caimito on 29 December 2004. According to Ridgely & Greenfield (2001) there are no records from the Caimito area, and its presence in the Mache-Chindul Mountains is only suspected but has not been recorded to date.

BLACKISH-HEADED SPINETAIL *Synallaxis tithys*
On 31 October–1 November 2004 a pair was observed and tape-recorded in secondary woodland dominated by young trees and cacti, at Reserva Cerro Seco. They had a nest in a dense spiny Mimosaceae tree, 3 m above ground, similar to that described by Balchin (1996). This Endangered species (BirdLife International 2008) occurs north to the Bahía de Caráquez region. Numbers have seemingly declined in recent years, making new records—particularly from protected areas—important.

EASTERN KINGBIRD *Tyrannus tyrannus*
One was observed for over 15 minutes atop *Ceiba* and *Bursera* trees in Reserva Cerro Seco, on 1 November 2004. Vegetation is dominated by dry forest on a steep slope overlooking the ocean. This is the first record of *T. tyrannus* south of prov. Pichincha and from the Ecuadorian coast, as well as one of the few records west of the Andes (see Vogt 2007).

TAWNY-CROWNED GREENLET *Hylophilus ochraceiceps*
Several were observed on visits to Reserva Montecaimito and surroundings on 4–7 and 27–31 December 2004, mostly in the canopy and borders of secondary forest patches, often within mixed-species flocks. No previous records from southern prov. Esmeraldas (Ridgely & Greenfield 2001), even from the fairly well-known Bilsa Biological Station, in Mache-Chindul Ecological Reserve, *c.*45 km east of the Quingue–Caimito area (Hornbuckle & Mudd 1997; L. Carrasco *in litt.* 2008).

SPECKLE-BREASTED WREN *Thryothorus sclateri*
On 11 September 2005 a group of at least four was seen and heard in a dense tangle of vines and understorey vegetation at Río Muchacho. The northernmost records in coastal Ecuador known to Ridgely & Greenfield (2001) were from the environs of Bahía de Caráquez, 20 km south of Río Muchacho, but subsequently they (Ridgely & Greenfield 2006) extended its range to Pedernales.

PROTONOTARY WARBLER *Protonotaria citrea*
On 5 December 2004 I observed three foraging in secondary forest at Reserva Integral Montecaimito, at 20 m. They were accompanying a mixed-species flock including Dot-winged Antwren *Microrhopias quixensis*, Red-eyed Vireo *Vireo olivaceus*, Red-legged Honeycreeper *Cyanerpes cyaneus*, White-shouldered Tanager *Tachyphonus luctuosus* and Buff-winged Saltator *Saltator maximus*, and were in the subcanopy near a small stream that flows into a freshwater pond near the sea. They were observed at close range (3–5 m), and identified by the bright yellow extending to the belly and flanks, white undertail-coverts and greyish flight-feathers. One appeared duller and was perhaps a female. They were not observed again on the following days. There are few records of *P. citrea* in Ecuador, and this is the first from southern prov. Esmeraldas, the closest being an old specimen taken at Esmeraldas city (Ridgely & Greenfield 2001).

New sites for threatened species

Though not extending current ranges, Table 2 summarises new sites for threatened species (BirdLife International 2008) and Tumbesian EBA endemics (Stattersfield *et al.* 1998).

Cerro El Aromo

On 28–29 August 2005 the following widespread species were noted *c.*20 km south of previously known localities. Their presence was not unexpected as humid foothill forest continues south to southern prov. Guayas and adjacent El Oro.

Four pairs of White-flanked Antwrens *Myrmotherula axillaris* and at least three pairs of Dot-winged Antwrens *Microrhopias quixensis* were observed and heard in mixed-species flocks in secondary forest at El Aromo. Flocks were led by *M. axillaris* and Checker-throated Antwren *M. fulviventris*, and also comprised One-coloured Becard *Platypsaris homochrous*, Plain Xenops *Xenops minutus*, Ochre-bellied Flycatcher *Mionectes oleagineus*, Tropical Gnatcatcher *Polioptila plumbea*, White-shouldered Tanager *Tachyphonus luctuosus*, Olivaceous Woodcreeper *Sittasomus griseicapillus*, Pacific Elaenia *Myiopagis subplacens*, Lesser Greenlet *Hylophilus decurtatus* and Blue-black Grosbeak *Cyanocompsa cyanoides*. Also, Masked Tityra *Tityra semifasciata* was observed in the canopy, Southern Nightingale Wren *Microcerculus marginatus* was heard inside secondary forest and three pairs of Guira Tanagers *Hemithraupis guira* foraged within mixed-species flocks at forest borders.

Isla de La Plata

Cisneros-Heredia (2005) recently updated bird records from this small island just 30 km off the Manabí coast. Isla de La Plata has been repeatedly visited by ornithologists since Chapman (1926) and Murphy (1936), but the most intensive effort to survey its avifauna only came in 1990 (Ortiz-Crespo & Agnew 1992).

I recorded six new landbirds to the island during a strong rainy season that permitted intense vegetation growth (pers. obs.). Grey-capped Cuckoo *Coccyzus lansbergi* was heard daily and three were seen at close range in dense woodland. Song is reportedly given only when breeding (Ridgely & Greenfield 2001) thus suggesting local nesting. Anthony's Nightjar *Caprimulgus anthonyi* was heard only once, but nocturnal surveys were not specifically performed, so it could be more numerous. A single female Ringed Kingfisher *Megaceryle torquata* was observed twice on one day but not subsequently. Streaked Flycatcher *Myiodynastes maculatus* was observed three times at woodland borders, whilst two Baird's Flycatchers *M. bairdii* were heard daily and seen chasing each other, also at woodland borders. Finally, Black-lored Yellowthroat *Geothlypis auricularis* (*sensu* Ridgely &

TABLE 2

List of Tumbesian EBA endemics and threatened species recorded at seven study sites (excluding wetlands). See Table 1 for site details: (1) Reserva Integral Montecaimito, (2) Mompiche, (5) Finca Integral Río Muchacho, (6) Reserva Cerro Seco, (8) Isla de La Plata, (9) Refugio de Vida Silvestre Parque Lago, (10) Cerro El Aromo. Endemism follows Stattersfield *et al.* (1998) and threat category follows BirdLife International (2008).

Species	1	2	5	6	8	9	10
Pale-browed Tinamou *Crypturellus transfasciatus* (NT)	*	*					
Grey-backed Hawk *Leucopternis occidentalis* (EN)	*	*	*				
Rufous-headed Chachalaca *Ortalis erythroptera* (VU)	*	*	*				
Brown Wood Rail *Aramides wolfi* (VU)	*						
Ecuadorian Ground Dove *Columbina buckleyi*	*	*	*	*	*		
Ochre-bellied Dove *Leptotila ochraceiventris* (VU)	*						
Red-masked Parakeet *Aratinga erythrogenys* (NT)	*	*					
Grey-cheeked Parakeet *Brotogeris pyrrhopterus* (EN)	*	*					
Pacific Parrotlet *Forpus coelestis*	*	*	*	*	*	*	
Anthony's Nightjar *Caprimulgus anthonyi*	*	*	*				
West Peruvian Screech Owl *Otus (Megascops) roboratus*	*						
Little Woodstar *Chaetocercus bombus* (VU)	*						
Orange-fronted Barbet *Capito squamatus* (NT)	*	*					
Ecuadorian Piculet *Picumnus sclateri*	*						
Guayaquil Woodpecker *Campephilus gayaquilensis* (NT)	*	*					
Blackish-headed Spinetail *Synallaxis tithys* (EN)	*						
Collared Antshrike *Sakesphorus bernardi*	*						
Elegant Crescentchest *Melanopareia elegans*	*						
Pacific Elaenia *Myiopagis subplacens*	*	*	*				
Grey-breasted Flycatcher *Lathrotriccus griseipectus* (VU)	*						
Sooty-crowned Flycatcher *Myiarchus phaeocephalus*	*	*	*				
Baird's Flycatcher *Myiodynastes bairdii*	*						
Pacific Royal Flycatcher *Onychorhynchus occidentalis* (VU)	*						
Slaty Becard *Pachyramphus spodiurus* (EN)	*						
Ecuadorian Thrush *Turdus maculirostris*	*	*	*	*			
Plumbeous-backed Thrush *Turdus reevei*	*						
Fasciated Wren *Campylorhynchus fasciatus*	*	*	*				
Grey-and-gold Warbler *Basileuterus fraseri*	*						
Black-capped Sparrow *Arremon abeillei*	*						
Crimson-breasted Finch *Rhodospingus cruentus*	*	*	*				
White-edged Oriole *Icterus graceannae*	*						

Greenfield 2001, 2006) was observed daily in reasonable numbers (four singing males along a 200-m trail). Local breeding seems probable.

To date the avifauna of Isla de La Plata (76 species) includes 34 marine or coastal species and 42 landbirds (Table 3). However, only six seabirds and ten landbirds are reported to breed (Cisneros-Heredia 2005). I noted breeding evidence (nests, begging chicks, courtship display, intense singing) for 15 species, including seven not previously reported to do so (Table 3). Further, I did not record the introduced House Sparrow *Passer domesticus*, a species unlikely to be overlooked, whilst Tumbes Pewee *Contopus punensis*, previously reported as a breeder, was also apparently absent during my survey.

The differences in landbird composition, especially the breeding community, reported here suggest regular immigration and extinction/emigration from the mainland. This might also account for 28 terrestrial species recorded only once on the island (Cisneros-Heredia 2005). I suspect that the breeding avifauna of Isla de La Plata will continue to change in the future, and that climate plays a key role in shaping species composition on

TABLE 3

Landbird avifauna of Isla de La Plata. Bold indicates breeding species; 28 species recorded just once are omitted (see Cisneros-Heredia 2005). Note different survey months (=seasons); more birds are expected to breed during rainy months (December–April/May) than dry months (June–November).

July–September 1990 (Ortiz-Crespo & Agnew 1992)	**July 2000 (Cisneros-Heredia 2005)**	**February 2008 (this study)**
Turkey Vulture *Cathartes aura*	Cattle Egret *Bubulcus ibis*	Cattle Egret *Bubulcus ibis*
Plumbeous Kite *Ictinia plumbea*	**Turkey Vulture** *Cathartes aura*	Striated Heron *Butorides striatus*
Croaking Ground Dove *Columbina cruziana*	Ecuadorian Ground Dove *Columbina buckleyi*	**Turkey Vulture** *Cathartes aura*
Groove-billed Ani *Crotophaga sulcirostris*	**Croaking Ground Dove** *Columbina cruziana*	Peregrine Falcon *Falco peregrinus*
Short-tailed Woodstar *Myrmia micrura*	**Short-tailed Woodstar** *Myrmia micrura*	**Croaking Ground Dove** *Columbina cruziana*
Vermilion Flycatcher *Pyrocephalus rubinus*	Little Woodstar *Chaetocercus bombus*	Eared Dove *Zenaida auriculata*
Long-tailed Mockingbird *Mimus longicaudatus*	**Grey-and-white Tyrannulet** *Pseudelaenia leucospodia*	**Grey-capped Cuckoo** *Coccyzus lansbergi*
House Wren *Troglodytes aedon*	Yellow-bellied Elaenia *Elaenia flavogaster*	Anthony's Nightjar *Caprimulgus anthonyi*
Southern Yellow Grosbeak *Pheucticus chrysogaster*	**Red-eyed Vireo** *Vireo olivaceus*	**Short-tailed Woodstar** *Myrmia micrura*
Collared Warbling Finch *Poospiza hispaniolensis*	**Long-tailed Mockingbird** *Mimus longicaudatus*	Ringed Kingfisher *Megaceryle torquita*
Peruvian Meadowlark *Sturnella bellicosa*	Southern Yellow Grosbeak *Pheucticus chrysogaster*	**Grey-and-white Tyrannulet** *Pseudelaenia leucospodia*
House Sparrow *Passer domesticus*	**Collared Warbling Finch** *Poospiza hispaniolensis*	**Tawny-crowned Pygmy Tyrant** *Euscarthmus meloryphus*
	House Sparrow *Passer domesticus*	**Vermilion Flycatcher** *Pyrocephalus rubinus*
		Streaked Flycatcher *Myiodynastes maculatus*
		Baird's Flycatcher *Myiodynastes bairdii*
		Snowy-throated Kingbird *Tyrannus niveigularis*
		Red-eyed Vireo *Vireo olivaceus*
		Long-tailed Mockingbird *Mimus longicaudatus*
		House Wren *Troglodytes aedon*
		Black-lored Yellowthroat *Geothlypis auricularis*
		Southern Yellow Grosbeak *Pheucticus chrysogaster*
		Crimson-breasted Finch *Rhodospingus cruentus*
		Collared Warbling Finch *Poospiza hispaniolensis*
		Peruvian Meadowlark *Sturnella bellicosa*

the island. Annual surveys will provide further insights into the dynamics of the landbird community.

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The biology and conservation status of Gough Bunting *Rowettia goughensis*

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Gough Bunting *Rowettia goughensis* is a large (60 g) finch endemic to Gough Island in the central South Atlantic Ocean. It evolved from South American finches and is closely related to *Nesospiza* buntings from Tristan da Cunha (Ryan *et al*. 2007), but also bears a striking resemblance to *Melanodera*, a genus of finches found in southern South America and the Falklands (Lowe 1923). Gough Bunting was initially described as two species: *Nesospiza goughensis* for birds in the plain olive adult plumage and *N. jessiae* for birds in the distinctive, streaky juvenile plumage (Clarke 1904, 1905). Clarke assumed that the transitional immature plumage was the winter plumage of *N. goughensis*. Lowe (1923) corrected this misconception and, given its unusually long bill and apparent affinity to *Melanodera*, placed the species in its own genus.

Relatively little has been published on the biology of Gough Bunting (Collar & Stuart 1984) and its nest and eggs were described as recently as 1979 (Voisin 1979). The species is currently listed as Vulnerable because it is confined to a single, small island (BirdLife

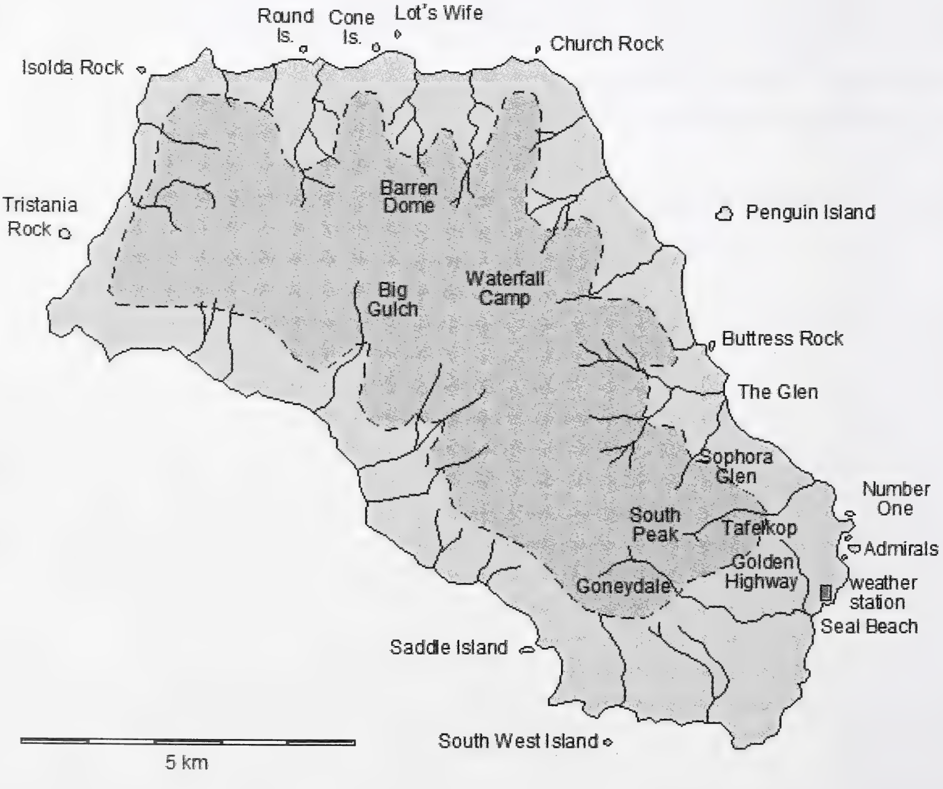
Round Is.
Cone Is.
Lot's Wife
Church Rock
Isolda Rock
Tristania Rock
Barren Dome
Penguin Island
Big Gulch
Waterfall Camp
Buttress Rock
The Glen
Sophora Glen
Number One
South Peak
Tafelkop
Admirals
Golden Highway
Goneydale
weather station
Seal Beach
Saddle Island
South West Island
5 km

Figure 1. Gough Island, showing the locations mentioned in the text, as well as the large offshore stacks. The dark shaded area is the approximate extent of highland habitats (wet heath, *Sphagnum* bogs and feldmark).

International 2004), and is at risk from the accidental introduction of predators such as rats *Rattus* spp. or cats *Felis catus*. Tristan Bunting *Nesospiza acunhae* became extinct on the main island of Tristan da Cunha barely 50 years after the island was settled by humans, probably as a result of the introduction of House Mice *Mus musculus* and feral cats (Ryan in press). They apparently were extinct prior to the arrival of Black Rats *Rattus rattus*, which were only introduced to Tristan in 1882 (Hagen 1952).

Recently, concern has been raised about the status of Gough Bunting, given probable predation of eggs and chicks by introduced House Mice (Cuthbert & Hilton 2004). Impacts are probably greater in the lowlands, where mouse densities are greater, resulting in most buntings being confined to highlands (Cuthbert & Hilton 2004). The few nests found at low elevations in 2000/01 were confined to coastal cliffs, where the risk of mouse predation presumably is reduced. The higher predation rate of artificial nests in lowland areas than in highland areas was used to support this hypothesis (Cuthbert & Hilton 2004). If mice have impacted Gough Bunting, it is important to test whether a new equilibrium has been reached after more than a century of interaction, or whether the bunting population continues to decrease.

Here, we present recent observations on the distribution and abundance of Gough Bunting, suggesting that the population has decreased significantly, and continues to decline. We estimate the abundance of invertebrate prey in different habitats to assess whether competition or predation is the main driver of bunting population decreases. We also summarise information on the bird's plumage development and morphology, foraging behaviour, breeding biology and movements.

Review of status

Discovered by the Portuguese in 1505, the position of Gough Island was incorrectly recorded, and it was only rediscovered in 1731. The island's inhospitable coast and lack of sheltered anchorages resulted in few landings until the start of commercial sealing in the early 19th century, when mice were introduced accidentally (Wace & Holdgate 1976). The first records of the terrestrial biota were made by George Comer, a sealer who spent five months based at The Glen in 1888–89. He reported that buntings were 'very common' (Verrill 1895: 463). At least five were collected close to the shoreline in The Glen during a four-hour visit by naturalists from the *Scotia* in April 1904 (Clarke 1905), and Wilkins (1923) collected 28 specimens during a four-day visit in May–June 1922. Wilkins reported that buntings occurred in 'considerable numbers' at The Glen, becoming 'not quite so plentiful' at higher elevations (p. 505). He usually found them foraging in groups of 5–7 birds, with roughly equal numbers of adults and juveniles.

Gough Bunting was still quite common in the 1950s to 1970s. The Gough Scientific Expedition estimated a total population of 2,000 birds in 1956, when they were common in The Glen (Holdgate 1957, 1958). Based on their experience in 1956, Wace & Holdgate (1976) reported buntings to be more common than moorhens. In May 1968, Clive Elliott found buntings to be 'numerous' along the beach at The Glen (Elliott 1969); he observed 16 buntings (50% in juvenile or immature plumage) at The Glen during two days ashore (Elliott 1970). In 1977, Voisin (1979) reported the bunting to be 'fairly abundant', and in 1980 Clancey (1981) judged it to be 'not uncommon' around the weather station, occurring in thickets of island tree *Phylica arborea* as well as coastal tussock. By comparison, Richardson (1984) found the bunting to be not particularly common on a five-day visit in October–November 1974. He proposed a total population as low as 200 pairs, based on an estimate of 4 pairs/km^{-2}. His assessment may have been influenced by his experience of

Nesospiza buntings at Inaccessible and Nightingale Islands in the Tristan group, which occur at much higher densities than Gough Buntings (up to 20 pairs/ha^{-1} in coastal tussock on Inaccessible; PGR unpubl.). Surprisingly, Richardson (1984) did not record buntings above 300 m elevation, although it is unclear to what extent he explored upland areas.

Subsequent to 1980, there are few published data on the abundance and distribution of the bunting. BirdLife International (2000) gave an estimate of 1,500 pairs, based on density estimates made by territory mapping in 1990–91 (this paper). This was revised to 400–500 pairs (BirdLife International 2004) based on Cuthbert & Sommer's (2004) estimate of 23 pairs/km^{-2} in wet heath vegetation at Gonydale, extrapolated across 15.2 km^{2} of wet heath, and 1.7 pairs/km^{-1} along 42 km of coastal cliffs. Cuthbert & Sommer (2004) ignored pairs nesting in other habitat types. However, their estimate of density in the highlands was in error, being incorrectly calculated from a mean nearest-neighbour distance of 118 m between nests to provide an estimated density of 23 pairs/km^{-2}. The correct figure should be roughly 90 pairs/km^{-2} (Cuthbert & Sommer 2004). Using inter-nest distances is biased, however, because nests are clustered along stream banks and gulleys. A better estimate is obtained by dividing the number of nests (13) by the area of Gonydale (*c.*65–85 ha), which gives roughly 15–20 pairs/km^{-2} in upland wet heath vegetation.

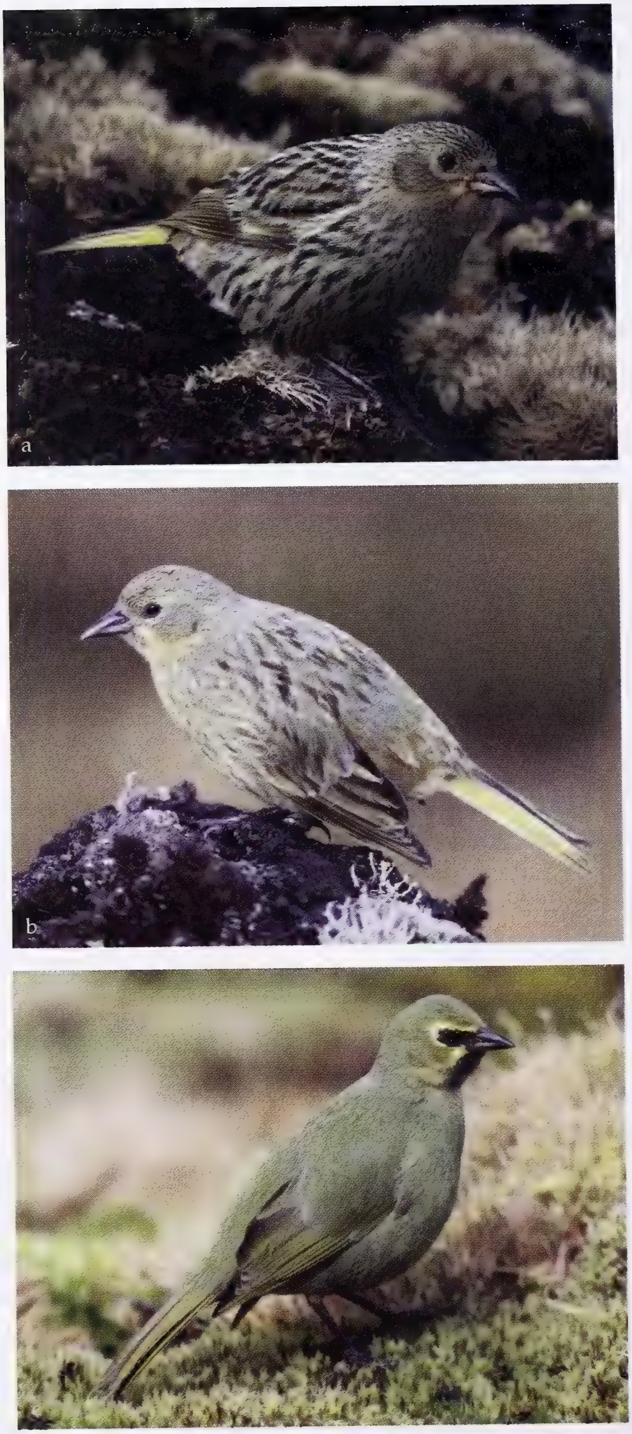

Figure 2. Gough Buntings *Rowettia goughensis*, showing the three main plumages exhibited in spring: a) a streaky juvenile which is presumably one year old, b) an immature female in transitional plumage (males have a black bib in this plumage), and c) an adult male in plain olive plumage, showing a relatively large and intense dark face mask and bib (P. G. Ryan)

Study area and methods

Gough (40°S, 10°W) is a remote, cool temperate island of 65 km^2 lying 380 km south-southeast of Tristan da Cunha. It is mountainous, with convex cliffs along the west coast, gently sloping lowlands in the south, and deeply incised valleys along the north and east coasts, of which The Glen is the largest. The island has five main vegetation types (Wace 1961). Tussock grassland, dominated by *Spartina arundinacea* and *Paridochloa flabellata*, occurs up to 300 m on coastal cliffs, mainly along the west coast. Fern bush is a diverse plant community found in coastal lowlands, locally to *c*.450 m. Characteristic species include the island tree *Phylica arborea* and bogfern *Blechnum palmiforme*. At higher elevations, fern bush grades into wet heath, a transitional vegetation type with large numbers of grasses, sedges and mosses. Areas of impeded drainage in the highlands support *Sphagnum* bogs, whereas the highest peaks and exposed ridges have short feldmark vegetation (Ryan 2007). In addition to the main island, there are several offshore stacks (Fig. 1). The largest and most isolated stack is Penguin Island, a 2.2-ha vegetated stack 750 m off the east coast. The only other large stack with extensive vegetation is Saddle Island (*c*.0.8 ha), 250 m off the west coast.

Gough Buntings were caught with long-handled scoop nets by PGR during 3–4 week visits to the South African weather station in the spring (September–October) of 1990, 1991, 1999, 2001, 2006 and 2007. All birds were weighed, measured and banded, with most being given unique colour band combinations. The following measurements were taken: mass to the nearest 0.2 g, flattened wing chord and tail to the nearest 1 mm, tarsus to the nearest 0.2 mm, and total head, culmen length and bill depth at the base to the nearest 0.1 mm. Adults and immatures could be sexed on the basis of plumage characters (males have larger masks and bibs), behaviour and vocalisations. However, streaky juveniles could not be sexed reliably. Some additional birds, mainly fledglings, were colour banded during the summers of 2000/01 by RJC and 2004/05 by Marie-Heléne Burle. The age and sex ratios of banded birds are not considered to be representative of the population as a whole, because juveniles are easier to catch than older birds, and the difficulty of catching adult males and females varies during the breeding season. Bunting movements were estimated from re-sightings of individually colour-marked birds.

In 1990, 1991 and 2007, territories were mapped in the South Peak–Tafelkop region (*c*.30 ha) using individually colour-marked birds to determine territory boundaries. Approximate numbers of pairs also were counted in several other areas, based on observations of singing males and nest searches. Density estimates were extrapolated across the island, assuming 25 km^2 of suitable habitat above 450 m (wet heath and sheltered slopes). In September 2007, all buntings encountered in upland areas were counted during a survey of Tristan Albatross *Diomedea dabbenena* chicks, and classified in three age classes (Fig. 2): streaky juveniles (birds 1–2 years old), immatures in transitional plumage (presumably 2–3 years old), and adults (plain olive plumage, 3+ years old). The proportion of juveniles in different areas was then related to the breeding success of Tristan Albatrosses in these areas (Cuthbert *et al*. 2004, Wanless 2007), to test whether areas with high mouse predation on albatross chicks have fewer juvenile buntings. We also visited Penguin Island to assess the numbers of buntings there. Penguin Island is very seldom visited, and is apparently free of introduced mice; searches for droppings and burrows (readily found on the main island) revealed no sign of their presence.

Bunting foraging behaviour and diet were studied by direct observation during all visits to Gough. Most prey items were small invertebrates that could not be identified accurately, but the foraging technique and the substratum from which they were obtained

TABLE 1

Numbers of pairs of Gough Buntings *Rowettia goughensis* holding territories in different areas of Gough Island in 1990/91 and 2007. Numbers in parentheses include pairs not in adult plumage.

Region	Habitat	Approximate area	1990/91	2007
South Peak–Tafelkop	wet heath	30 ha	10	4 (7)
Waterfall Camp	wet heath	10 ha	5	1 (2)
Golden Highway cliffs	fern bush	15 ha	1 (2)	0
Seal Beach to Admirals	coastal tussock	5 ha	2 (3)	2
The Glen	tussock and fern bush	4 ha	5	1
Total		66 ha	23 (25)	8 (12)

were recorded. In addition, in 1990 bunting faeces and the stomach contents of one bird killed accidentally in a mouse trap at Waterfall Camp were examined under a dissecting microscope. To assess the abundance of invertebrate prey in different habitats, we placed pitfall traps in coastal tussock, fern bush and wet heath in December 2000. Two sites were selected in each habitat, with 20 traps deployed at each site. The traps were emptied after six days in coastal tussock and fern bush, and after ten days in wet heath. The numbers of invertebrates were counted, with no attempt to correct for the different exposure periods.

The locations and contents of all bunting nests found were described. Nests were readily located during the incubation and brood stage, because males regularly feed females at the nest (see Results), with females uttering a distinctive begging call. Not all nests on cliffs could be accessed, and thus sample sizes for nest sites are larger than those for other nest parameters. Nest dimensions were measured to the nearest 5 mm and eggs to the nearest 0.1 mm. The behaviour of breeding buntings was observed during nest observations lasting 80 hours at 15 nests in 1990 and 2000. The male and female of each breeding pair could be distinguished in the field based on plumage and vocal differences.

Results

A total of 117 Gough Buntings was banded on Gough between 1990 and 2007: 106 in the highlands, nine in coastal tussock around the weather station between Seal Beach and the Admirals, and two at The Glen. Most were full grown, but 27 were banded as chicks or fledglings, all in the highlands. Fifteen (nine adults, one immature, three juveniles and two fledglings) were re-sighted at least six months after being banded. Most were seen 1–2 years later, but two (one banded as an adult male and one as a fledgling) were seen seven years later. Median displacement was 0 m (mean 230 m). The longest movements were 1.2 km, made by a juvenile after seven months, and 0.8 km, by a fledgling in just less than two years. All other movements were <500 m, and not readily distinguished from no movement, given that buntings were seen to fly at least 500 m on occasions during intraspecific aerial chases. Adults usually remained in their territories, but occasionally chased other buntings over adjacent territories. Juveniles tended to be more mobile, sometimes being chased at least 800 m by two or more pairs of territory holders. Occasional juveniles were observed making long-distance movements of their own volition; one flew *c.*1 km from the upper reaches of Sophora Glen south beyond Tafelkop, travelling high over at least three territories.

All birds banded in adult plumage retained this plumage in subsequent sightings. The only bird banded in transitional immature plumage had moulted into adult plumage a year later. Two birds banded in streaky juvenile plumage in spring, at least one year after fledging, had moulted into immature plumage a year later. Another juvenile, banded in March, still retained juvenile plumage in October. However, a fledgling seen almost two years later

TABLE 2

Mass (g) and morphometrics (mm) of Gough Buntings *Rowettia goughensis*. Juveniles cannot be sexed reliably on external characters.

Character	Male (*n*=20) mean ± SD (range)	Female (*n*=27) mean ± SD (range)	Juveniles (*n*=40) mean ± SD (range)
Mass	60.1 ± 3.4 (53.0–66.1)	57.2 ± 3.9 (50.2–67.8)	58.1 ± 3.5 (48.0–64.7)
Wing	106.5 ± 1.1 (104–108)	103.0 ± 1.6 (100–106)	105.2 ± 2.3 (99–109)
Tail	86.9 ± 4.0 (76–91)	85.5 ± 4.4 (76–92)	82.3 ± 4.5 (71–92)
Tarsus	31.2 ± 1.0 (29.2–32.8)	30.9 ± 0.8 (29.2–32.6)	31.3 ± 1.0 (28.8–33.0)
Total head	42.9 ± 0.6 (42.0–44.2)	42.6 ± 0.6 (41.5–43.9)	42.7 ± 0.7 (41.1–44.2)
Culmen	19.0 ± 0.6 (18.0–20.0)	18.8 ± 0.5 (18.0–20.1)	18.8 ± 0.5 (17.9–19.9)
Bill depth	8.7 ± 0.2 (8.2–9.0)	8.6 ± 0.2 (8.3–9.0)	8.7 ± 0.2 (8.1–9.2)

was still in streaky juvenile plumage, indicating that at least some retain this plumage for two years.

Abundance and distribution.—Gough Buntings were observed throughout the island, but were rare in fern bush, and most abundant at higher elevations, especially in wet heath. Territory mapping in wet heath in the South Peak–Tafelkop region found ten pairs of adult buntings holding territories in 1990 and 1991. Given an area of 30 ha, this suggests a mean density of *c.*30 pairs/km^{-2}. In 2007, this had fallen to seven pairs, of which in only four were both birds in adult plumage. Two of the other three pairs comprised an immature male and an adult female, whilst the final pair was a juvenile (presumably male) and an adult female. Only two 'mixed' pairs comprising immature and adult birds were found in 1990, both at low elevation (Table 1). No bunting pairs were found in fern bush in 2007 (Table 1). The most dramatic decrease between 1990 and 2007 occurred at The Glen. Five pairs were found along the beach and adjacent valley up to the Northern Rockhopper Penguin *Eudyptes chrysocome* colony in 1990, but only one bird was seen in this area in 2007. The contrast between The Glen and Penguin Island, lying just offshore, was remarkable. We heard at least four singing males in *c.*1 ha on Penguin Island during a brief visit on 30 September 2007, whereas no singing was heard over a much larger area on the same morning at The Glen.

Surveys of upland areas in September 2007 counted 148 buntings. Of these, 20% were streaky juveniles, 8% were immatures in transitional plumage and 72% were adults. There was a tendency for the proportion of juveniles to be lower in areas where Tristan Albatross breeding success was low (Fig. 3), although this was only marginally significant (r_6=0.674, $F_{1,6}$=4.98, *P*=0.07). No juveniles were observed in the north-west of the island, where buntings were scarce (only 18 buntings seen north-west of a line between Big Gulch and Barren Dome). Buntings also were scarce in this area in 1990, where the mean distance between pairs was estimated to be *c.*500 m, compared to 100–200 m in similar habitat in the southern highlands.

Population size.—A population of 1,500 pairs was estimated based on the density of pairs in 1990–91 (BirdLife International 2000). This assumed that South Peak–Tafelkop and Waterfall Camp were typical of favourable upland areas (25 km^2 with 40 pairs/km^{-2} = 1,000 pairs). Of the remaining 40 km^2, half was assumed to be moderate habitat including cliffs suitable for breeding (20 km^2 with 20 pairs/km^{-2} = 400 pairs), and the other half was largely unsuitable, flat lowland (20 km^2 with 5 pairs/km^{-2} = 100 pairs). The density estimate of

TABLE 3

Foraging behaviour and diet (% of observations) of Gough Buntings *Rowettia goughensis* in lowland and highland habitats at Gough Island. Prey obtained from the first seven behaviours listed was mainly small invertebrates.

Character	Lowland (n=88)	Highland (n=446)
Digging and pulling up vegetation	21.6	37.7
Pulling apart rotten *Phylica arborea* wood	1.1	0.0
Gleaning epiphytes on *Phylica arborea*	20.5	0.0
Gleaning epiphytes on *Blechnum palmiforme*	10.2	0.4
Gleaning other vegetation	25.0	23.3
Entering seabird burrows	2.3	0.7
Hawking flying insects	1.1	0.4
Seeds of grasses and sedges	5.7	2.9
Nertera depressa fruits	13.6	32.7
Empetrum rubrum fruits	1.1	1.3
Scavenging muscle from bird carcasses	0.0	1.1

around 15–20 pairs/km^{-2} in Gonydale in 2000/01 is similar to that in the Tafelkop–South Peak area in 2007.

The population estimate requires revision in view of our recent density data. The southern highlands (15 km^2) may support *c.*20 pairs/km^{-2}, but this is probably optimistic for the northern highlands (10 km^2), where 5 pairs/km^{-2} is more likely. This yields a highland population of *c.*350 pairs. If the lowlands around the weather station and at The Glen are typical of the entire island, there are probably few buntings away from coastal cliffs over the remainder. Given a coastline of *c.*40 km, and using Cuthbert & Hilton's (2004) inter-nest distance on coastal cliffs of 600 m, this adds a further 65 nests. Offshore stacks may support relatively high densities of buntings, but they are small and unlikely to support more than a few tens of pairs. Thus the breeding population is probably 400–500 pairs. If 20% of birds are juveniles, and only half of the 8% immatures are paired, the total population in spring, in the pre-breeding season, is likely to be 1,050–1,350 birds.

Morphology and moult.—There was little difference between the sexes in terms of morphology, with males averaging 5% heavier and 1–3% larger in most linear measurements (Table 2). The mean size of juveniles, comprising both sexes, was intermediate between males and females, apart from the shorter tail length of juveniles. This is a function of the heavy wear exhibited in the tail-feathers of many juvenile buntings in spring. No birds were moulting flight-feathers; they presumably undergo a complete post-breeding moult in February–April like *Nesospiza* (PGR unpubl.).

Foraging behaviour, diet and the abundance of invertebrates.—Gough Buntings spent a large proportion of daylight hours foraging. Most food was obtained on or close to the ground, but birds in lowland habitats often gleaned prey from epiphytes on island trees and bogferns (Table 3). In the highlands, invertebrate prey was obtained by pulling up tufts of moss and other loose vegetation, or by gleaning insects from a wide variety of plants. Occasionally buntings would hawk airborne flies and moths, as well as scavenge flesh from seabird carcasses. Most invertebrate prey could not be identified, but large items included earthworms, caterpillars and moths. Bunting faeces contained the remains of flightless moths, spiders, and adult and larval beetles.

TABLE 4
Mean numbers of invertebrates per pitfall trap set at two sites in three habitats on Gough Island in December 2000.

Taxon	Coastal tussock (*n*=40) mean ± SE	Fern bush (*n*=36) mean ± SE	Wet heath (*n*=16*) mean ± SE
Diptera	16.4 ± 4.5	7.2 ± 1.4	0.2 ± 0.1
Coleoptera	4.7 ± 1.1	7.9 ± 4.9	0.3 ± 0.2
Lepidoptera	0.0 ± 0.0	0.0 ± 0.0	1.1 ± 0.3
Arachnida	1.0 ± 0.3	1.7 ± 0.4	0.6 ± 0.2
Acari	1.4 ± 0.5	2.5 ± 1.0	0.1 ± 0.1
Annelida	0.3 ± 0.2	0.2 ± 0.1	0.0 ± 0.0
Mollusca	0.1 ± 0.0	0.8 ± 0.2	0.1 ± 0.1
Isopoda	2.7 ± 0.6	6.0 ± 1.0	0.2 ± 0.1
Myriopoda	8.9 ± 4.2	92.9 ± 45.4	0.0 ± 0.0
Other insect orders	0.1 ± 0.1	0.1 ± 0.1	0.1 ± 0.1

*Sample size in wet heath reduced because Subantarctic Skuas *Catharacta antarctica* dug up many traps.

The most conspicuous food taken in large quantities in the highlands was *Nertera depressa* fruit. All age classes ate these fruits, sometimes in large numbers. One adult male was observed to eat 37 fruits in two minutes. *Nertera* fruits were nibbled, apparently to extract the fleshy pulp, and the skin dropped. Each fruit contains two hard seeds, and these usually are discarded. Of 20 fruits discarded by a foraging bunting, 13 contained two seeds and the remainder one seed. Despite this, bunting faeces contained up to 20 *Nertera* seeds, and the gizzard of a juvenile contained 300 *Nertera* seeds. Buntings also ate seeds of a range of sedges (*Carex insularis*, *C. thouarsii*, *Scirpus sulcatus*, *S. bicolor*, *Uncinia compacta*) and grasses, including native (*Agrostis*, *Calamagrostis* and *Deschampsia* spp.) and introduced species (*Holcus lanatus*, *Poa annua*).

Pitfall traps caught 5,752 invertebrates. Most (64%) were millipedes (Myriopoda), which apparently are not consumed by buntings. Of the remaining 2,051 invertebrates, 45% were flies (Diptera), 23% beetles (Coleoptera), 16% woodlice (Isopoda), 12% spiders and ticks (Arachnida and Acari), and smaller proportions of molluscs, earthworms and other insect orders. Apart from moths (Lepidoptera), invertebrate prey was more abundant in lowland habitats than in wet heath (Table 4).

Breeding biology.—Most breeders were in adult plumage, but some in transitional immature plumage were found, including a pair of immatures at Seal Beach in 1990. Breeding occurs from September to December. We found 12 nests with eggs or chicks in October, nine in November and nine in December, but breeding commences earlier at lower elevations. Voisin (1979) reported that chicks from a nest near sea level at the weather station fledged in early October, suggesting that the eggs were laid at the end of August. The earliest we saw fledged chicks was 18 October at *c*.200 m and 25 October at 500 m. The latest nests with eggs were found on 23 December at 450 m in Gonydale (one with two eggs, and another with one egg and one newly hatched chick).

Nests were open cups, constructed on or close to the ground, sheltered by overhanging vegetation or a rock. All nests in coastal tussock and fern bush (<450 m elevation) were sited on cliffs at least 4 m above ground (*n*=8). Most nests in upland areas also were on steep slopes (*n*=26), usually along stream banks, gulleys or on rock outcrops; only three were on relatively flat ground. The female constructed the nest, usually gathering material within 20 m of the nest site and flying with it to the nest. Initial material was coarse and large (up to

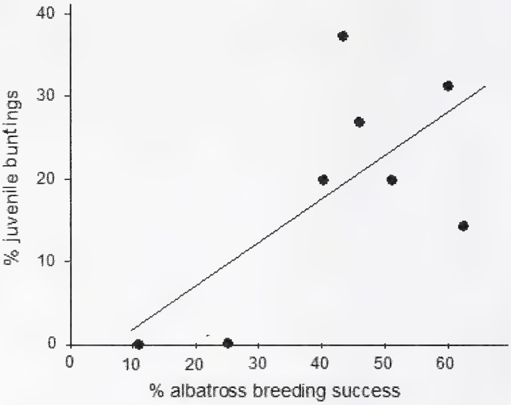

Figure 3. Correlation ($r^2=0.45$, $P<0.07$) between the proportion of juvenile Gough Buntings *Rowettia goughensis* and Tristan Albatross *Diomedea dabbenena* breeding success in different highland areas in 2007.

20 cm long), mainly grass and sedge leaves plus occasional fern fronds. Once the basic structure was assembled, it was lined with finer material, usually *Scirpus bicolor* stems. Completed nests measured 148 ± 16 mm (SD, range 130–190 mm) across, with a cup 92 ± 12 mm (75–100 mm) across and 55 ± 15 mm (35–90 mm) deep (*n*=14).

The pale blue eggs, variably speckled grey-brown, with markings usually concentrated at the blunt end, were laid 1–2 days apart. Clutch size was 2.0 ± 0.25 eggs (1–3; *n*=33 including data from Voisin 1979, Williams & Imber 1982). The mean size of 36 eggs was 27.7 ± 1.2 mm (25.5–30.2) × 19.4 ± 0.5 mm (18.3–20.4) (including the two eggs reported by Voisin 1979). Incubation was by the female alone. Duration of the incubation period is unknown. The male assisted by feeding the female on average every 22.7 ± 9.5 minutes (range 4–50 minutes, *n*=64 inter-visit intervals), calling to her, whereupon she left the nest to be fed. She also foraged for herself, leaving the eggs unattended for on average 6.3 ± 5.5 minutes (1–28 minutes, *n*=73 incubation absences). After hatching, the chicks were brooded by the female for several days. Brood shifts averaged shorter (10.4 ± 7.7 minutes, 1–31 minutes, *n*=29) than incubation shifts (15.3 ± 9.7 minutes, 2–44 minutes, *n*=62), but periods away from the nest were only slightly longer (8.7 ± 5.9 minutes, 1–24 minutes, *n*=37). The male continued to feed the female during brooding, but the interval between feeds increased (average 32.7 ± 15.4 minutes, 10–69 minutes, *n*=20). The male did not feed the chicks directly while the female was brooding, but once she started to spend more time foraging, he delivered food directly. Large chicks (>10 days old) were fed every 16.5 ± 11.4 minutes (1–55 minutes, *n*=83). Chicks fledged after *c*.20 days, but remained concealed in cover for another week or so. Thereafter, they remained on the natal territory, and were fed by the adults at least occasionally, for several weeks.

The only breeding success data are those reported by Cuthbert & Hilton (2004) from Gonydale. Overall, 52% of nests fledged at least one chick, and given a mean 1.67 fledglings per successful nest, this results in a mean of 0.87 fledglings per breeding attempt. There is no evidence that pairs raise more than one brood per season, but at least one pair re-laid 23 days after the loss of its first clutch. The second clutch also failed.

Discussion

Numbers of Gough Buntings have decreased since the first records were made of the species in the late 19th century, and they continue to do so. Most significantly, territory mapping in 2007 suggests that the population has roughly halved within the last two decades. The increasing occurrence of birds breeding in immature plumage and holding territories in juvenile plumage also is indicative of a decreasing population. Gough Buntings are strongly territorial, with adults chasing young from their territories (Holdgate 1958; pers. obs.). That juveniles and immatures now hold territories suggests that there are more vacant territories than was the case even a decade or so ago. Wilkins (1923) reported that most buntings occurred in flocks of up to seven; this is no longer the case. Birds are typically solitary or in pairs; one group of four seen in September 2007 was exceptional.

Recent decreases have been most marked at lower elevations. Buntings were still fairly common in fern bush around the weather station in the 1970s (Voisin 1979, Clancey 1981), but were virtually absent by 1990. They disappeared from mid-elevation cliffs inland of the weather station between 1990 and 2007, and have become much less abundant at The Glen over this period. This apparently continues a long-term trend of a decrease in numbers at low elevation. Cuthbert & Hilton (2004) considered the possibility that the greater abundance of buntings at higher elevations may simply reflect the pre-mouse distribution of the birds, but Wilkins (1923) specifically mentioned that buntings were more common along the coast than inland. *Nesospiza* buntings also are more abundant at low elevations on Inaccessible Island, Tristan da Cunha (PGR unpubl.).

Two findings support the hypothesis that mice are responsible for the decrease in bunting numbers. First is the abundance of buntings on Penguin Island. Landing on this apparently mouse-free islet was reminiscent of landing on Inaccessible or Nightingale in the Tristan group, both of which are free of introduced rodents and support high densities of buntings. The density of buntings on Gough is almost two orders of magnitude lower than that in coastal tussock on Inaccessible. Second is the paucity of juveniles in the population. Wilkins (1923) suggested that streaky juveniles occurred in equal numbers to adults in 1922, and Elliott (1957) reported that juveniles were rather more common than adults in 1952. This contrasts with the situation in 2007, when only 20% of birds were juveniles. The low proportion of juveniles suggests that recruitment is insufficient to maintain the population.

Mice could affect buntings either through competition for food or predation of eggs and chicks (Cuthbert & Hilton 2004). These are not mutually exclusive impacts, but their relative importance can be assessed by examining the distribution of buntings in relation to the availability of their food. If competition is the main factor, we would expect buntings to persist in areas where their food is most abundant. Our pitfall trap data refute this, suggesting that food is not preventing Gough Buntings from occurring in the coastal lowlands on Gough. Predation is thus probably the main factor driving the population decline, which supports the finding that artificial bunting nests suffered much greater predation by mice in the lowlands than the highlands (Cuthbert & Hilton 2004). It is perhaps surprising that juvenile buntings do not descend to the lowlands to forage, especially in the face of aggression by territory holders in the highlands. This may be a consequence of their limited dispersal range, or possibly other issues, such as disturbance by mice while roosting in the lowlands. The limited movements exhibited by individually marked buntings accord with previous observations of banded birds at The Glen (Holdgate 1958).

The breeding biology of Gough Buntings is similar to that of *Nesospiza* buntings on Inaccessible Island (Fraser & Briggs 1992, Ryan & Moloney 2002). The main difference is the selection of nest sites. Most *Nesospiza* nests are on the ground in fairly flat terrain (Ryan & Moloney 2002), whereas Gough Buntings typically nest on cliffs or steep slopes. There are no historical records to test whether this difference is an adaptive response to reduce the risk of mouse predation, or simply a function of the heavier rainfall on Gough. However, it is certain that buntings no longer breed in fern bush around the weather station where the first nest was described (Voisin 1979). Also, the prevalence of cliff nesting is greatest at low elevations, where mouse densities are greater, and predation of artificial nests much greater (Cuthbert & Hilton 2004), suggesting that mice are indeed responsible for buntings avoiding nesting in easily accessible sites on Gough (or the selective removal of pairs that nest in readily accessible sites). The rate of delivery of food to the nest was similar to that of Tristan Buntings *N. acunhae* at Inaccessible (Fraser & Briggs 1992), both during incubation (2.6 h^{-1} at

Gough, 2.7 h^{-1} at Inaccessible) and when provisioning chicks (3.6 h^{-1} at Gough, 5.7 h^{-1} at Inaccessible). This suggests that, at least in Gonydale, Gough Buntings did not struggle to obtain invertebrate food. However, competition for food between mice and buntings is likely to be most severe in winter, when mouse populations decrease dramatically due to starvation (Wanless 2007; RJC unpubl.). Competition for food in winter is likely to result in reduced annual survival, especially among juvenile buntings. Unfortunately we lack sufficient data to test this hypothesis.

Gough Bunting breeding success in Gonydale in 2000/01 was not particularly low. The estimate of 0.87 fledglings per breeding attempt compares favourably with data for *Nesospiza* buntings at Inaccessible (0.82 fledglings per attempt, *n*=139 nests; PGR unpubl.). However, breeding success in Gonydale may be atypical, given that Tristan Albatrosses consistently have better breeding success here than anywhere else on the island (Cuthbert *et al.* 2004, Wanless 2007). The reason for spatial heterogeneity in mouse impacts across Gough is obscure, and it is not immediately evident why there should be a link between predation on albatross chicks in winter and that on bunting eggs and chicks in early summer. One possibility is that higher winter survival of albatross-eating mice enhances local mouse populations, increasing pressure on nesting buntings in spring. The low proportion of juvenile buntings elsewhere on the island, especially in the north-west, where albatross breeding success is invariably very poor, suggests that bunting breeding success probably is lower in other areas than that recorded at Gonydale. Climate change may exacerbate this problem, as warmer winters will presumably permit more mice to survive.

We lack sufficient data on survival to construct a robust demographic model for the bunting. It is unclear when mice arrived on the island (although it was presumably between 1800 and 1888), or when they started to impact the bunting. It may be a relatively recent phenomenon, because the climate at Gough has warmed over the last 40 years (Jones *et al.* 2003). Irrespective of the considerable uncertainty regarding this system, it seems clear that the Gough Bunting population is decreasing, and that its threat status should be revised. With a population of *c.*1,000 mature individuals confined to a single site of only 65 km², and having experienced a population decrease of *c.*50% over the last three generations (assuming the mean age of breeding adults is 5–6 years), it qualifies as Critically Endangered under IUCN Criterion B1 a+b (ii, v), a recommendation accepted by BirdLife's assessment panel (S. Butchart *in litt.* 2008). The plight of this distinctive endemic species provides further, urgent impetus for calls to eradicate mice from Gough (www.rspb.org.uk/ourwork/conservation/projects/tristandacunha/index.asp).

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On *Elminia nigromitrata* (Reichenow, 1874) (Monarchidae): subspecies and lectotype designation

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In 1994, Dickerman described a new subspecies of Dusky Crested Flycatcher, *Elminia nigromitrata colstoni* (originally described in the genus *Trochocercus*), based on type material from Liberia, leaving the exact distribution of this western population and the geographical barriers between subspecies vague. Current taxonomy accepts the taxon as valid (e.g. Erard 1997, Dickinson 2003, Clement 2006). Apart from the holotype and other specimens from Liberia, a single individual from southern Nigeria was reluctantly assigned by the describer to *E. n. colstoni*, though subspecific determination seemed difficult. Whilst Dickerman (1994) stated that *colstoni* 'probably occupies forested regions west of the Dahomey forest gap' (despite the single specimen from Nigeria), all verified specimens of nominate *E. n. nigromitrata* (Reichenow, 1874), including its lectotype (see below), are from south-east Cameroon and further east. This leaves the question of subspecific identity of individuals of *E. nigromitrata* east of the Dahomey Gap (Benin), but west of the Cameroonian mountains, i.e. in Nigeria and south-west Cameroon.

Field data from south-west Cameroon

All eight birds mist-netted during a field survey in Banyang-Mbo (05°20'N, 09°28'E), near Nguti, south-west Cameroon, were determined as *E. n. colstoni* (see Sammler 2007). They showed the characters described by Dickerman (1994), *viz* 'similar to the nominate population but slightly paler and brighter blue both dorsally and ventrally, less dull, flat grey'. The 'distinct tendency dorsally to have a white-tinged collar' was also recorded. Additionally, in subsequent comparisons with museum specimens, a difference in tail colour was noted: blackish (Smithe 1975: colour 89, Jet Black) in *colstoni* (*contra* Clement 2006) including individuals from Banyang-Mbo, compared to brownish in the nominate (Smithe 1975: colour 119, Sepia).

Measurements of wing, tail, tarsus and bill confirm the two subspecies. Twenty-five specimens of *E. n. colstoni* from Liberia in BMNH and AMNH (for museum acronyms see Acknowledgements), and 56 specimens of *E. n. nigromitrata* from south-east Cameroon, Equatorial Guinea, Central African Republic, Democratic Republic of Congo (DRC), Uganda and Kenya, in BMNH, AMNH, ZMB and RMCA, are significantly different in these measurements (see Table 1; $p=0.004$, Monte Carlo Permutation Test, 499 permutations). Western *colstoni* has a smaller wing, and a slightly shorter tail and bill, compared to nominate *nigromitrata* (Table 1). Tarsi of both populations are similar in size. Measurements of one specimen from Nigeria (BMNH 1950.9.8) and one collected in Banyang-Mbo (BMNH 2008.2.9) are broadly similar to *colstoni* from Liberia (*cf.* Table 1).

However, nine specimens collected by W. Serle from the region of Kumba (the so-called Kumba Gap) are intermediate in coloration (tail between 89, Jet Black, and 119, Sepia in Smithe 1975) and measurements, slightly weighted towards *colstoni* ($p=0.552$ compared to *colstoni*; $p=0.048$ compared to nominate *nigromitrata*, see Table 1; Monte Carlo Permutation Test, 499 permutations). Serle (1950) himself regarded six of them, all collected pre-1950, as *nigromitrata*; the other three taken post-1950 are not discussed in his subsequent papers (Serle 1954, 1965). Given the record of *E. n. colstoni* in Banyang-Mbo, its range now extends

TABLE 1

Measurements of *Elminia nigromitrata* (Reichenow, 1874) held at BMNH, AMNH, ZMB and RMCA (for museum acronyms see Acknowledgements), by locality, from west to east, and by sex. Measurements in mm; m = male, f = female; localities per labels (countries/regions added); wing = maximum chord from carpal to tip; tail from skin to tip of longest feather; tarsus from distal margin of intertarsal joint to distal margin of last undivided scale; bill (upper mandible) from skull insertion to tip. Asterisks indicate measurements of damaged parts (not used for mean and range)—these specimens and those of uncertain subspecies (without number) were not used in the permutation test.

No	sex	Inventory numbers	subspecies	Location	date	collector (no.)	wing	tail	tarsus	bill
1	m	BMNH 1977.20.2208	*colstoni*	Mt. Nimba, Grassfield, Liberia (550 m)	12.07.1967	Forbes-Watson	60.2	59.6	16.1	13.6
2	m	BMNH 1977.20.2225	*colstoni*	Mt. Nimba, Mine Road, Liberia (1,000 m)	11.07.1968	Forbes-Watson	59.0	64.0	14.0	12.5
3	m	BMNH 1977.20.2212	*colstoni*	Mt. Nimba, Grassfield, Liberia	24.01.1969	Forbes-Watson	63.3	66.2	15.0	14.2
4	m	BMNH 1977.20.2209	*colstoni*	Mt. Nimba, Grassfield, Liberia (550 m)	13.01.1968	Forbes-Watson	61.8	65.0	15.6	13.2
5	m	BMNH 1977.20.2204	*colstoni*	Mt. Nimba, Grassfield, Liberia (550 m)	08.06.1967	Forbes-Watson	60.0	66.0	16.5	14.3
6	m	BMNH 1977.20.2205	*colstoni*	Mt. Nimba, Grassfield, Liberia (550 m)	26.07.1967	Forbes-Watson	60.8	63.3	16.0	14.3
7	m	BMNH 1977.20.2206	*colstoni*	Mt. Nimba, Grassfield, Liberia (550 m)	28.06.1967	Forbes-Watson	64.2	67.0	16.6	13.1
8	m	BMNH 1977.20.2207	*colstoni*	Mt. Nimba, Grassfield, Liberia (550 m)	23.08.1967	Forbes-Watson	60.9	63.0	16.4	13.7
9	m	BMNH 1977.20.2210	*colstoni*	Mt. Nimba, Grassfield, Liberia (550 m)	25.09.1967	Forbes-Watson	60.0	62.2	16.5	14.5
10	m	BMNH 1977.20.2213	*colstoni*	Mt. Nimba, Liberia	11.09.1965	Forbes-Watson	58.9	61.5	15.3	14.4
11	m	BMNH 1977.20.2226	*colstoni*	Mt. Nimba, Mine Area, Liberia	24.01.1968	Forbes-Watson	59.0	60.0	15.5	13.5
12	m	AMNH 827746	*colstoni*	Lofa Country, Liberia (750 m)	16.03.1990	Schmitt	63.6	66.0	15.8	15.0
13	f	BMNH 1977.20.2218	*colstoni*	Mt. Nimba, Grassfield, Liberia (550 m)	28.06.1967	Forbes-Watson	57.8	59.8	15.4	12.1
14	f	BMNH 1977.20.2216	*colstoni*	Mt. Nimba, Grassfield, Liberia (550 m)	24.08.1967	Forbes-Watson	57.6	60.0	15.4	11.5
15	f	BMNH 1977.20.2220	*colstoni*	Mt. Nimba, Grassfield, Liberia	18.01.1966	Forbes-Watson	57.0	57.0	14.3	13.5
16	f	BMNH 1977.20.2215	*colstoni*	Mt. Nimba, Grassfield, Liberia (550 m)	12.07.1967	Forbes-Watson	57.9	57.6	15.2	13.2
17	f	BMNH 1977.20.2223	*colstoni*	Mt. Nimba, Grassfield, Liberia	25.06.1966	Forbes-Watson	58.8	62.0	15.9	14.2
18	f	BMNH 1977.20.2221	*colstoni*	Mt. Nimba, Grassfield, Liberia (550 m)	14.06.1967	Forbes-Watson	58.3	61.0	14.7	14.1
19	f	BMNH 1977.20.2224	*colstoni*	Mt. Nimba, Grassfield, Liberia	23.01.1969	Forbes-Watson	58.6	58.4	15.0	13.2
20	f	BMNH 1977.20.2217	*colstoni*	Mt. Nimba, Grassfield, Liberia (550 m)	27.07.1967	Forbes-Watson	54.5	58.6	14.0	12.7
21	f	BMNH 1977.20.2222	*colstoni*	Mt. Nimba, Grassfield, Liberia (550 m)	05.06.1967	Forbes-Watson	56.0	56.5	15.3	12.3
22	f	BMNH 1977.20.2219	*colstoni*	Mt. Nimba, Grassfield, Liberia (550 m)	05.07.1976	Forbes-Watson	57.0	57.8	13.2	13.0
23	f	BMNH 1977.20.2227	*colstoni*	Mt. Nimba, Yekepa, Liberia	25.04.1968	Forbes-Watson	58.0	58.7	15.5	13.6
24	f	AMNH 827745	*colstoni*	Lofa Country, Liberia (750 m)	15.03.1990	Schmitt	57.2	55.8	15.1	14.1
25	f	AMNH 827743	*colstoni*	Lofa Country, Liberia (750 m)	13.03.1990	Carter	57.5	58.3	14.5	14.0
	m	BMNH 1950.9.8	*colstoni*	Isoba, Port Harcourt, Nigeria	23.10.1949	Marchant (334)	60.1	63.4	15.5	13.3

	f	BMNH 2008.2.9	*colstoni*	Banyang-Mbo, Cameroon	25.03.2006	Steinheimer & Sammler	56.8	56.8	15.9	14.4
	m	BMNH 1952.20.248	[intergradient]	Kumba, Cameroon (245 m)	22.09.1947	Serle (C.810)	60.2	65.0	15.1	15.1
	m	BMNH 1952.20.246	[intergradient]	Kumba, Cameroon (215 m)	02.02.1950	Serle (C.3809)	62.3	63.3	15.8	15.5
	m	BMNH 1952.20.247	[intergradient]	Kumba, Cameroon (215 m)	26.06.1950	Serle (C.4278)	65.8	56.5*	16.5	15.8
	m	BMNH 1966.16.4884	[intergradient]	Kumba, Cameroon (365 m)	09.06.1947	Serle (C.304)	57.9	58.2	15.4	13.7
	m	BMNH 1966.16.4885	[intergradient]	Kumba, Cameroon (365 m)	14.04.1947	Serle (C.85)	61.8	64.0	15.7	15.2
	f	BMNH 1952.20.243	[intergradient]	Kumba, Cameroon (245 m)	22.09.1947	Serle (C.809)	58.7	56.8	14.5	14.3
	f	BMNH 1952.20.244	[intergradient]	Kumba, Cameroon (215 m)	14.10.1949	Serle (C.3454)	59.2	55.3*	14.6	14.3
	f	BMNH 1952.20.245	[intergradient]	Kumba, Cameroon (245 m)	04.06.1947	Serle (C.287)	57.4	57.8	15.3	13.0
	f	BMNH 1966.16.4886	[intergradient]	Kumba, Cameroon (245 m)	05.02.1947	Serle (C.1055)	58.7	55.0	14.9	13.2
	m	ZMB 21935 [Lectotype]	*nigromitrata*	Cameroon River, Cameroon	30.01.1873	Reichenow (332)	65.8	66.0	16.8	12.8*
1	m	BMNH 1909.8.8.34	*nigromitrata*	Zima, Cameroon	05.10.1905	Bates	58.8	57.0	15.5	14.7
2	m	BMNH 1920.6.26.300	*nigromitrata*	Bitye, River Ja, Cameroon (610 m)	08.03.1915	Bates (5941)	63.2	62.8	15.6	14.5
3	m	BMNH 1909.8.8.35	*nigromitrata*	between Kribi and Efulen, Cameroon	25.07.1907	Bates (2561)	58.4	57.2	14.0	14.9
4	m	BMNH 1926.8.8.213	*nigromitrata*	Bitye, River Ja, Cameroon (610 m)	02.06.1924	Bates (7909)	63.8	64.2	14.7	15.0
5	m	BMNH 1906.12.14.66	*nigromitrata*	Efulen, Cameroon	03.07.1905	Bates (837)	64.9	63.8	15.5	15.0
6	m	BMNH 1909.8.8.36	*nigromitrata*	between Kribi and Efulen, Cameroon	13.07.1907	Bates (2622)	62.2	59.5	15.2	15.0
7	m	BMNH 1904.18.72	*nigromitrata*	Efulen, Cameroon	29.03.1904	Bates (408)	61.9	61.2	15.8	14.2
8	m	BMNH 1926.6.26.296	*nigromitrata*	Bitye, River Ja, Cameroon (610 m)	18.06.1910	Bates (4222)	60.7	63.0	13.5	14.0
9	m	BMNH 1906.12.14.67	*nigromitrata*	Efulen, Cameroon	07.08.1905	Bates (1012)	62.3	62.0	16.5	15.0
10	m	BMNH 1920.6.26.297	*nigromitrata*	Bitye, River Ja, Cameroon (610 m)	23.11.1910	Bates (4494)	61.3	62.7	16.1	14.8
11	m	BMNH 1903.10.26.63	*nigromitrata*	Efulen, Cameroon	23.05.1903	Bates (163)	60.0	61.4	14.5	14.9
12	m	AMNH 650074	*nigromitrata*	Bitye, Cameroon	06.07.1914	Bates (5822)	64.2	63.7	14.8	14.2
13	?	BMNH 1923.8.7.1529	*nigromitrata*	Lolodorf, South Cameroon	?	Clarke	62.0	61.3	15.0	14.3
14	?	BMNH 1923.8.7.1530	*nigromitrata*	Lolodorf, South Cameroon	?	Clarke	66.5	65.2	15.8	14.5
15	f	BMNH 1920.6.26.299	*nigromitrata*	Bitye, River Ja, Cameroon (610 m)	24.09.1909	Bates (3926)	60.3	57.5	14.6	13.2
16	f	BMNH 1903.10.26.62	*nigromitrata*	River Ja, Cameroon	01.02.1903	Bates (84)	60.0	59.0	14.1	13.4
17	f	BMNH 1920.6.26.298	*nigromitrata*	Bitye, River Ja, Cameroon (610 m)	06.07.1910	Bates (4266)	56.4	54.0	14.1	13.6
18	f	BMNH 1906.12.14.65	*nigromitrata*	Efulen, Cameroon	16.06.1905	Bates (789)	58.1	54.2	14.5	14.8
19	f	BMNH 1909.8.8.37	*nigromitrata*	between Kribi and Efulen, Cameroon	13.07.1907	Bates (2623)	62.0	58.0	13.8	13.9
20	f	BMNH 1906.12.14.68	*nigromitrata*	Efulen, Cameroon	05.08.1905	Bates (1007)	60.1	56.4	14.2	13.2
21	f	ZMB 2000.10314	*nigromitrata*	Bebai, Equatorial Guinea, border to Cameroon	16.02.1909	Tessmann (463) (ex B 599)	58.4	58.0	15.8	13.9
22	f	ZMB 2000.10315	*nigromitrata*	Nkolentangan, Equatorial Guinea	14.04.1908	Tessmann (383) (ex B 599)	57.1	58.3	14.4	14.4
23	m	RMCA 127823	*nigromitrata*	Isopo, DRC (1,330 m)	04.02.1973	Prigogine (17197)	63.0	67.4	14.8	14.9
	m	RMCA 17591	*nigromitrata*	Manda, DRC	26.03.1925	Schouteden (718)	65.5	70.6	15.2	14.1*
24	m	RMCA 34933	*nigromitrata*	Bambesa, DRC	24.03.1939	Vrydagh (10472)	62.0	65.8	16.1	15.2
25	m	RMCA 45980	*nigromitrata*	Bokungu, DRC	28.02.1949	Dupuis	62.5	62.3	14.5	14.3

26	m	RMCA 103821	*nigromitrata*	Namoya, DRC	07.01.1957	Prigogine (9722)	64.2	65.6	14.0	15.1
27	m	RMCA 80–24-A-111	*nigromitrata*	Kiloboze, Kivu, DRC (1,020 m)	05.08.1979	Prigogine (19363)	61.9	64.6	15.1	14.0
28	m	RMCA 109056	*nigromitrata*	Kakanda, DRC	22.12.1961	Prigogine (10599)	64.0	65.8	14.9	15.1
29	m	RMCA 118861	*nigromitrata*	Lukigi, DRC (1,350 m)	09.03.1969	Prigogine (13803)	64.8	66.7	14.3	15.7
30	m	RMCA 80–24-A-112	*nigromitrata*	Kiloboze, Kivu, DRC (1,030 m)	31.08.1979	Prigogine (19364)	63.8	61.3	14.4	15.4
31	m	ZMB 2000.10313	*nigromitrata*	Beni, DRC	Jan 1908	Schubotz (483)	61.2	62.7	17.1	14.6
32	m	RMCA 101193	*nigromitrata*	Lima, DRC	12.07.1959	Dyleff (Lukala)	64.8	65.0	15.6	13.9
33	f	AMNH 832193	*nigromitrata*	Bayanga, Central African Republic (350 m)	24.06.1998	Sweet	59.7	58.8	15.3	14.0
34	f	RMCA 124783	*nigromitrata*	Nyamugu, DRC (1,360 m)	13.09.1970	Prigogine (15090)	62.2	61.2	14.9	14.5
35	f	RMCA 31403	*nigromitrata*	Angumu, DRC	28.09.1934	Dyleff	58.0	60.1	13.8	13.3
36	f	RMCA 101194	*nigromitrata*	Lima, DRC	09.07.1959	Dyleff (Lukala)	65.2	67.0	15.7	15.8
	f	RMCA 125827	*nigromitrata*	Kaseberi, DRC	06.01.1971	Prigogine (15806)	57.8	57.2	13.2*	13.8*
37	f	RMCA 84767	*nigromitrata*	Namoya, DRC (730 m)	15.12.1956	Prigogine (6813)	61.0	63.4	14.4	13.9
38	f	RMCA 122568	*nigromitrata*	Kaseberi, DRC	07.02.1970	Prigogine (14603)	61.0	62.2	15.1	14.2
39	f	RMCA 118828	*nigromitrata*	Igogo, DRC	12.12.1968	Prigogine (13770)	66.8	70.5	14.9	15.8
40	f	RMCA 69560	*nigromitrata*	Masongo, DRC	18.06.1951	Prigogine (4443)	63.4	68.2	14.8	14.4
41	f	RMCA 80–24-A-113	*nigromitrata*	Kiloboze, Kivu, DRC (1,020 m)	05.08.1979	Prigogine (19365)	60.2	60.7	15.1	13.9
42	f	RMCA 77–14-A-88	*nigromitrata*	Kiloboze, Kivu, DRC (1,080 m)	08.10.1976	Prigogine (18463)	59.5	61.2	14.6	13.0
43	m	BMNH 1913.6.24.117	*nigromitrata*	Toro Forest, Sanyo Bay, Uganda (3,800 m)	29.09.1911	Neave	63.0	65.3	14.5	14.2
44	m	BMNH 1913.6.24.118	*nigromitrata*	Budongo Forest, Unyoro, Uganda (3,400 m)	12.12.1911	Neave	63.0	64.8	15.2	13.8
45	m	AMNH 650080	*nigromitrata*	Budongo, Uganda	06.06.1919	van Someren	64.8	68.8	15.2	15.0
46	m	AMNH 650082	*nigromitrata*	Budongo, Uganda	14.12.1918	van Someren	62.0	64.9	15.9	15.1
47	m	AMNH 810287	*nigromitrata*	Kagamega Forest, Nyanza, Kenya (1,615 m)	23.06.1966	Zimmerman	62.9	64.8	16.1	14.0
48	m	AMNH 831044	*nigromitrata*	Kagamega Forest, Nyanza Dist., Kenya	01.08.1963	Zimmerman	62.1	64.7	15.9	14.0
49	m	AMNH 810284	*nigromitrata*	Kagamega Forest, Nyanza, Kenya (1,615 m)	14.06.1963	Zimmerman	61.7	66.2	15.7	14.1
50	m	AMNH 810288	*nigromitrata*	Kagamega Forest, Nyanza, Kenya (1,615 m)	28.06.1966	Zimmerman	62.0	66.1	15.1	15.2
51	m	AMNH 831613	*nigromitrata*	Kagamega Forest, Nyanza, Kenya	04.08.1965	Zimmerman	61.7	69.0	15.8	15.0
	m	BMNH 1971.16.111	*nigromitrata*	Kagamega Forest, Kenya	21.06.1970	Colston	65.0*	66.8	16.8	13.7
52	f	BMNH 1933.5.29.25	*nigromitrata*	Mabira, Uganda (4,000 m)	28.10.1913	Rosenberg	61.0	59.2	15.0	14.6
	f	BMNH 1913.6.24.119	*nigromitrata*	Budongo Forest, Unyoro, Uganda (3,400 m)	12.12.1911	Neave	58.1	00.0*	13.8	13.0
53	f	AMNH 650091	*nigromitrata*	Budongo, Uganda	20.05.1907	van Someren	64.4	64.2	16.0	14.6
54	f	AMNH 650086	*nigromitrata*	Budongo, Uganda	12.12.1918	van Someren	63.0	64.3	15.3	14.9
55	f	AMNH 650097	*nigromitrata*	Mabura, Uganda	03.05.1914	van Someren	64.2	63.8	15.4	14.6
56	f	BMNH 1971.16.112	*nigromitrata*	Kakamega Forest, Kenya	22.06.1970	Colston	58.0	64.6	15.9	13.9

colstoni				
Range	54.5–64.2	55.8–67.0	13.2–16.6	11.5–15.0
Mean (*n*=25, 25, 25, 25)	59.12	61.01	15.31	13.51
Standard deviation	2.36	3.33	0.86	0.84
nigromitrata				
Range	56.4–66.8	54.0–70.6	13.5–17.1	13.0–15.8
Mean (*n*=60, 60, 60, 58)	61.88	62.87	15.12	14.42
Standard deviation	2.46	3.83	0.81	0.68

west to the Cameroon Mountains, where it meets and hybridises with *E. n. nigromitrata* at the Kumba Gap. In fact, the Kumba Gap probably constitutes a second contact zone after separation of the two taxa during the Pleistocene, where montane forest then prevented contact between lowland forest species on either side (*cf.* Rand 1951).

Lectotype designation for *Terpsiphone nigromitrata* Reichenow, 1874

Our examination of the type material of *Elminia nigromitrata* (Reichenow, 1874) in the Museum für Naturkunde der Humboldt-Universität zu Berlin (ZMB) has also shown that Reichenow (1874: 110) based the name on a mixed series of two syntypes: a juvenile female *Trochocercus nitens* Cassin, 1859 (ZMB 21936), and an adult male of the species known today as *Elminia nigromitrata* (ZMB 21935). Subsequently, Reichenow (1890: 118–119, 1903: 500) voiced his doubts about ZMB 21936, due to its glossy head, and corrected its label to read '*nitens*', but without taking further action.

When Sharpe (1879) first examined Reichenow's type specimens he failed to note their different identities and, lacking typical specimens of *Trochocercus nitens*, inclined to the view that both differed from the latter. Later, after studying additional material in Leiden, he further confounded the situation by treating *nigromitrata* Reichenow as conspecific with *T. nitens* Cassin (Sharpe 1879: 301, footnote). The confusion continued (Sharpe 1904, 1907) until resolved by Bates (1911), who nevertheless still did not fix Reichenow's name firmly to the species known today as *nigromitrata*. To end this uncertainty, we designate the male specimen, of the taxon now known as *Elminia n. nigromitrata* (Reichenow, 1874) [ZMB 21935, Cameroon, collected by Reichenow (No. 332) on 30 January 1873, *cf.* Reichenow 1903: 500, specimen I. (Rchw.)], as the lectotype of *Terpsiphone nigromitrata* Reichenow, 1874: 110. The type locality was originally stated as 'Camerungebiet' but can formally be restricted to the 'Kamerunfluß' (Reichenow 1903: 500) = Cameroon estuary, Douala, Littoral Province, Cameroon. The female, of *Trochocercus nitens* Cassin, 1859 [ZMB 21936, Cameroon, collected by Reichenow (No. 199) on 5 November 1872] thus becomes a paralectotype.

Acknowledgements

We particularly thank Ragnar Kinzelbach, who initiated and part-funded our study of lowland forest birds at Banyang-Mbo. We acknowledge the use of the library and bird collections of the Museum für Naturkunde der Humboldt-Universität zu Berlin (ZMB) and The Natural History Museum, London/Tring (BMNH). We especially thank Sylke Frahnert (ZMB), Alison Harding, Mark Adams and Robert Prŷs-Jones (BMNH), Paul Sweet (American Museum of Natural History, New York, AMNH) and Michel Louette and Alain Reygel (Royal Museum for Central Africa, Tervuren, RMCA) for access to and loans of specimens, respectively. Many thanks also to Bob Dowsett, Michel Louette, Richard Schodde and Guy Kirwan for commenting on an earlier draft.

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The overlooked collection of Ludwig Kaiser and a little-known report on birds of Nauru

by Sylke Frahnert & Donald W. Buden

1 November 2007

Nauru (00°32′S, 166°56′E) is a small (21 km^2) single-island republic in the west-central Pacific Ocean, *c.*2,100 km north-east of New Guinea. Banaba (Ocean Island) is its nearest neighbour, *c.*300 km to the east. A 100–300 m wide coastal belt, where most of the *c.*10,000 islanders reside, abuts a scarp that rises to a max. 72 m on the central plateau. Coastal vegetation consists largely of strand, ruderal weeds and shrubs, ornamentals, and scattered coconut *Cocos nucifera* and fruit trees. More than 100 years of continuous phosphate mining has eliminated much of the plateau's original forest, leaving just remnants, mainly along the edges and slopes of the scarp. The interior is largely a regenerating scrubland within a skeletal framework of coral pinnacles 4–8 m high, from around which the soil and phosphate deposits have been excavated.

The avifauna of Nauru has received scant attention over the past nearly 130 years since Otto Finsch reported the five species he observed on 24 July 1880 (Finsch 1881). Pearson (1962) recorded at least 16 species over a period of six months in 1961, and he stated that Finsch's work comprised 'the only previous ornithological literature available concerning Nauru'. King (1967) and Garnett (1984) merged seabird records from Nauru with those from the Gilbert Islands (Kiribati), without stating which may have pertained only to the Gilberts. More recent checklists of Nauru birds (e.g. Owen 1977, Pratt *et al.* 1987, Cain *et al.* 1997) cite Pearson (1962) as a primary reference. However, none of these mentions an article that appeared in the notes section of volume 2 of the *Journal für Ornithologie* describing a collection of birds from Nauru made by Ludwig Kaiser in 1900, nor is this article mentioned in either of the two bibliographies of Nauru (Krauss 1970, Pollock 1994).

Ludwig Kaiser, born 21 March 1862 in Obergebisbach, Germany, held several different administrative positions in the German Marshall Islands at different times between 1889 and 1906—Deputy Landeshauptmann (Deputy Chief of Administration) in Jaluit, 1889–92; Stationsleiter (Station Chief) in the Protectorate of Nauru, 1899–1905?; and Acting Landeshauptmann in Jaluit in 1906 until his suicide later that year (Spennemann 1999–2000). Kaiser's Nauru collection (16 specimens of 12 species plus two skeletons, a nest, and two eggs of *Acrocephalus luscinius rehsei*) has been housed at the Museum für Naturkunde zu Berlin (ZMB) since it arrived in November 1901 via the Jaluit Corporation Hamburg and the Königliches Museum für Völkerkunde (Berlin). Kaiser apparently sent an accompanying annotated list that included measurements and colour notes of the specimens, as well as information concerning the status of the species on Nauru (breeder, non-breeder, captive). This list is not in the museum archives, and only the letter regarding delivery of the collection remains (ZMB archives, Zool. Mus. Sign. S III, Kaiser, L., p. 1). However, information from this list was published in the *Journal für Ornithologie* as a contribution to the meeting of the board of the German Ornithological Society, in January 1902 in Berlin, written by Paul Matschie.

Given the scarcity of information on the birds of Nauru, the obscure nature of the Kaiser publication, and the overall paucity of museum specimens from the island, we list here all of the specimens in this collection, with updated taxonomy following the nomenclature of Dickinson (2003), along with pertinent data from original specimen labels.

Additional information contributed by the authors is enclosed in brackets. Measurements are reported for selected specimens if important for species determination. They were taken from the label or directly from the skins (given in brackets) by one of us (SF).

Procellariidae

Audubon's Shearwater *Puffinus lherminieri*.—ZMB 2000.3375 (coll. no. 10), 5 March 1900. Kaiser (1902) stated that the species nests in deep rock holes and crevices, but did not explicitly indicate that it breeds on Nauru. Murphy (1927) remarked on having examined specimens of *P. lherminieri* in the Berlin Museum from Nauru and the Palau Islands. His Nauru material probably was confined to the specimen collected by Kaiser, which still appears to be the only specimen record of Audubon's Shearwater from Nauru.

Fregatidae

Lesser Frigatebird *Fregata ariel*.—ZMB 2000.2891 (coll. no. 1), 15 February 1900 [immature], apparently male; ZMB 2000.2890 (coll. no. 2), 15 February 1900 [immature]; ZMB 2000.2892 (coll. no. 3), 20 February 1900 [adult], male; noted on the label as having been kept in captivity for several months, and in having the naked skin (presumably referring to the gular pouch) 'blood red'. Kaiser (1902) remarked that the species does not breed on Nauru and that it arrives as singles or in small groups attracted by tamed birds.

Sulidae

Red-footed Booby *Sula sula*.—ZMB 2000.8517 (coll. no. 5), 3 March 1900 [juvenile], apparently male, feet grey. The only documented record of Red-footed Booby from Nauru. Kaiser (1902) wrote that lone birds were seen occasionally and were easy to catch by hand, though whether he was referring solely to that he collected or to others as well is unclear.

Charadriidae

Pacific Golden Plover *Pluvialis fulva*.—ZMB 2000.9504 (coll. no. 9d), 30 July 1900, female.

Scolopacidae

Whimbrel *Numenius phaeopus*.—ZMB 2000.8515 (coll. no. 9e), 30 July 1900, male. Kaiser (1902) indicated that it occurs on Nauru occasionally, and that he saw another 'Strandschnepfe' (possibly a *Limosa*), similar to *N. phaeopus* but with a straight bill, which he was unable to collect.

Wandering Tattler *Heteroscelus incanus*.—ZMB 2000.9508 (coll. no. 9c), 4 March 1900.

Ruddy Turnstone *Arenaria interpres*.—ZMB 2000.9506 (coll. no. 9a), 3 March 1900, female; ZMB 2000.9507 (coll. no. 9b), 3 March 1900.

Laridae

Greater Crested Tern *Sterna bergii*.—ZMB 2000.9509 (coll. no. 4), 1 March 1900 [immature], male, feet brown. The only documented record of *S. bergii* from Nauru. Kaiser (1902) recorded it as *S. media* (=*S. bengalensis* Lesser Crested Tern), but specimen comparison at the Museum für Naturkunde reveals that it was misidentified. Kaiser (1902) wrote that the species occurs very seldom on Nauru, and the birds are solitary. Measurements: total length 490 mm, [wing 323 mm (max. chord), bill 51 mm].

Brown Noddy *Anous stolidus*.—ZMB 2000.9510 (coll. no. 7), 3 March 1900, female. Kaiser (1902) stated that it breeds in large numbers on Nauru.

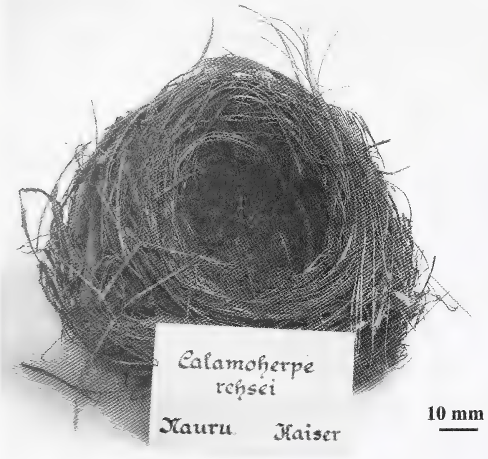

Figure 1 (above). Nest of Nauru Reed-Warbler *Acrocephalus luscinius rehsei* (Vera Heinrich)

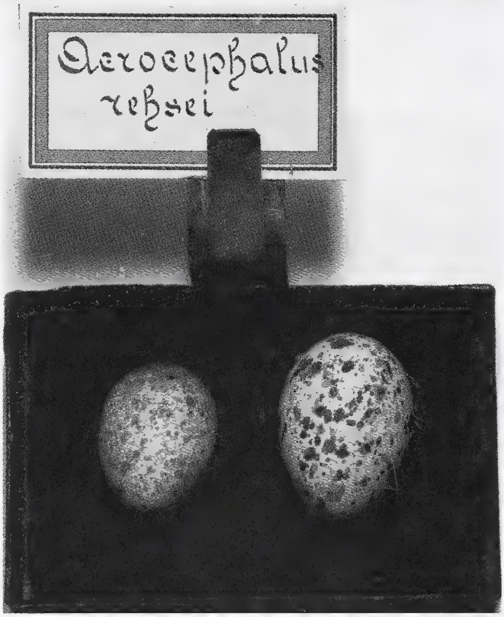

Figure 2 (right). Eggs of Nauru Reed-Warbler *Acrocephalus luscinius rehsei* (Vera Heinrich)

Black Noddy *Anous minutus*.—ZMB 2000.9511 (coll. no. 8), 3 March 1900. Kaiser (1902) stated that it breeds in large numbers on Nauru.

White Tern *Gygis alba*.—ZMB 2000.9512 (coll. no. 6), 3 March 1900; specimen obtained from captivity (Kaiser 1902).

Sylviidae

Nauru Reed-Warbler *Acrocephalus luscinius rehsei* [following Dickinson (2003), although most authors treat Nauru Reed-Warbler as a species endemic to Nauru].—ZMB 2000.3199 (coll. no. 11), 30 April 1900; ZMB 2000.3374 (coll. no. 11), 30 April 1900. Kaiser's (1902) report mentioned only one skin of Nauru Reed-Warbler, but the collection includes two. Only one bears an original (collector's) label, but both possess the same information on their museum labels, including the same field collection number. Given that 16 birds are mentioned in the original packing list, there is no doubt that both belong to the Kaiser collection. The packing list for the collection also mentions two skeletons, a nest and two eggs of Nauru Reed-Warbler. The skeletons were collected on 4 March 1900 and both are catalogued o/2266. The museum has two nests of *A. l. rehsei*. One is labelled as from the Kaiser collection (ZMB 2000.10012; Fig. 1) and the other is unlabelled, with no indication of provenance. The museum egg collection includes three eggs, one belonging to the Adolph Nehrkorn collection, whilst of the others (Fig. 2), one is recorded in the egg catalogue as ZMB 10346, but without any collection data. One or both eggs may belong to the Kaiser collection, but corroborating documentation is lacking.

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First records of Yellow-cheeked Becard *Pachyramphus xanthogenys* for Brazil, with comments on the validity of *P. x. peruanus*

by Alexandre Aleixo, Edson Guilherme & Kevin J. Zimmer

Received 8 November 2007

Yellow-cheeked Becard *Pachyramphus xanthogenys* occurs predominantly on the east slope of the Andes, in eastern Ecuador and central and south-east Peru, usually at 650–1,700 m (Mobley 2004). *P. xanthogenys* was formerly considered conspecific with the more widespread Green-backed Becard *P. viridis* (e.g. Traylor 1979), but Ridgely & Tudor (1994) treated it specifically, based on plumage and habitat differences, and geographical disjunction. Subsequent authors have been divided in their treatment of *xanthogenys*: Ridgely & Greenfield (2001) and Mobley (2004) treat it as a species, whereas others (e.g., Schulenberg *et al.* 2007) retain it as a race of *P. viridis*, pending a published analysis of the complex. When treated specifically, *P. xanthogenys* is considered to comprise two allopatric subspecies: *P. x. xanthogenys* Salvadori & Festa, 1898, in eastern Ecuador and northern Peru; and *P. xanthogenys peruanus* Hartert & Goodson, 1917, in central and south-east Peru (Mobley 2004). Because the holotype of *P. x. peruanus* is a female with supposed signs of immaturity (Hartert & Goodson 1917), the validity of this taxon has been considered uncertain (Mobley 2004).

On 25 August 2005, AA mist-netted and collected an adult male *P. xanthogenys* in breeding condition (left testis 9 × 5 mm; deposited at Museu Paraense Emílio Goeldi, Belém,

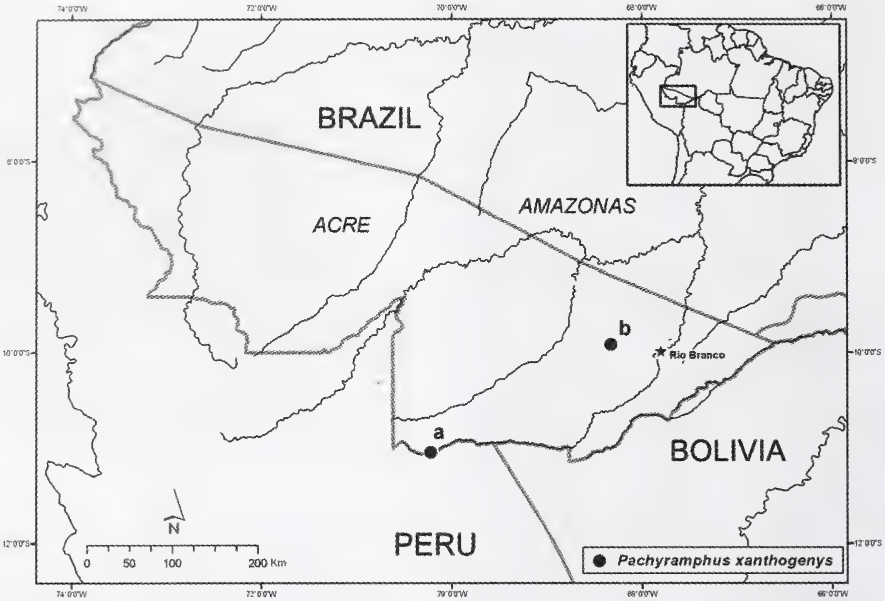

Figure 1. Locations where Yellow-cheeked Becard *Pachyramphus xanthogenys* has been recorded and collected to date in the Brazilian state of Acre: (a) Estação Ecológica do Rio Acre (11°00′S, 70°13′W), and (b) 'Transacreana' road (09°55′S, 68°20′W).

Brazil [MPEG 58925]), on hilly and broken terrain covered by *Guadua* bamboo with scattered emergent trees along the 'igarapé do Tombo' creek (elevation *c*.250 m), at Estação Ecológica do Rio Acre, a 77,500-ha conservation unit on the Brazilian / Peruvian border, in south-east Acre, Brazil (Fig. 1). The specimen showed all those characters distinguishing *P. xanthogenys* from congenerics, most conspicuously: the bright golden-yellow cheeks and throat, and lack of a grey nuchal collar (Fig. 2). Prior to this, a pair of *P. xanthogenys* was seen and heard above the mist-net where the specimen was taken; earlier, on 15 August, another pair was located vocalising intensively and chasing each other on the north bank of the rio Acre at a similar altitude and habitat, *c*.5 km away. Unfortunately, on neither occasion were birds observed carefully, mainly because AA thought they were *P. viridis*, whose song is very similar to that of *P. xanthogenys* (KJZ tape-recordings). During a second trip to Estação Ecológica do Rio Acre in the following rainy season (3–16 February 2006), no *P. xanthogenys* were located. Subsequently, on 8 September 2006 EG collected another specimen (tentatively sexed as female by plumage) of *P. xanthogenys* (MPEG 61447) in a logged forest *c*.3 km from the 'Transacreana' road (AC 090), *c*.60 km west of Rio Branco, the state capital of Acre (Figs. 1–2).

These specimens are the first records of *P. xanthogenys* for Brazil, and represent a significant range extension into lowland Amazonia. The nearest previous record is from 'Hacienda Amazonia', near Manu National Park, dpto. Madre de Dios, Peru, in June–July 2002 (Lebbin 2004), which involved a presumed pair that frequented successional scrub in a regenerating landslide atop a ridge at 880 m. Published elevational ranges for *P. xanthogenys* list the lower limit as 650 m in Ecuador (Ridgely & Greenfield 2001) and 800 m in Peru (Schulenberg *et al.* 2007), although KJZ has recorded it at 323 m in the foothills of the Tumbes Reserved Zone, dpto. Tumbes, Peru. It is interesting that the first Brazilian and the recent Madre de Dios records were in June–September, during a period coinciding with the austral winter, when the slopes of the eastern Andes are swept by strong Antarctic cold

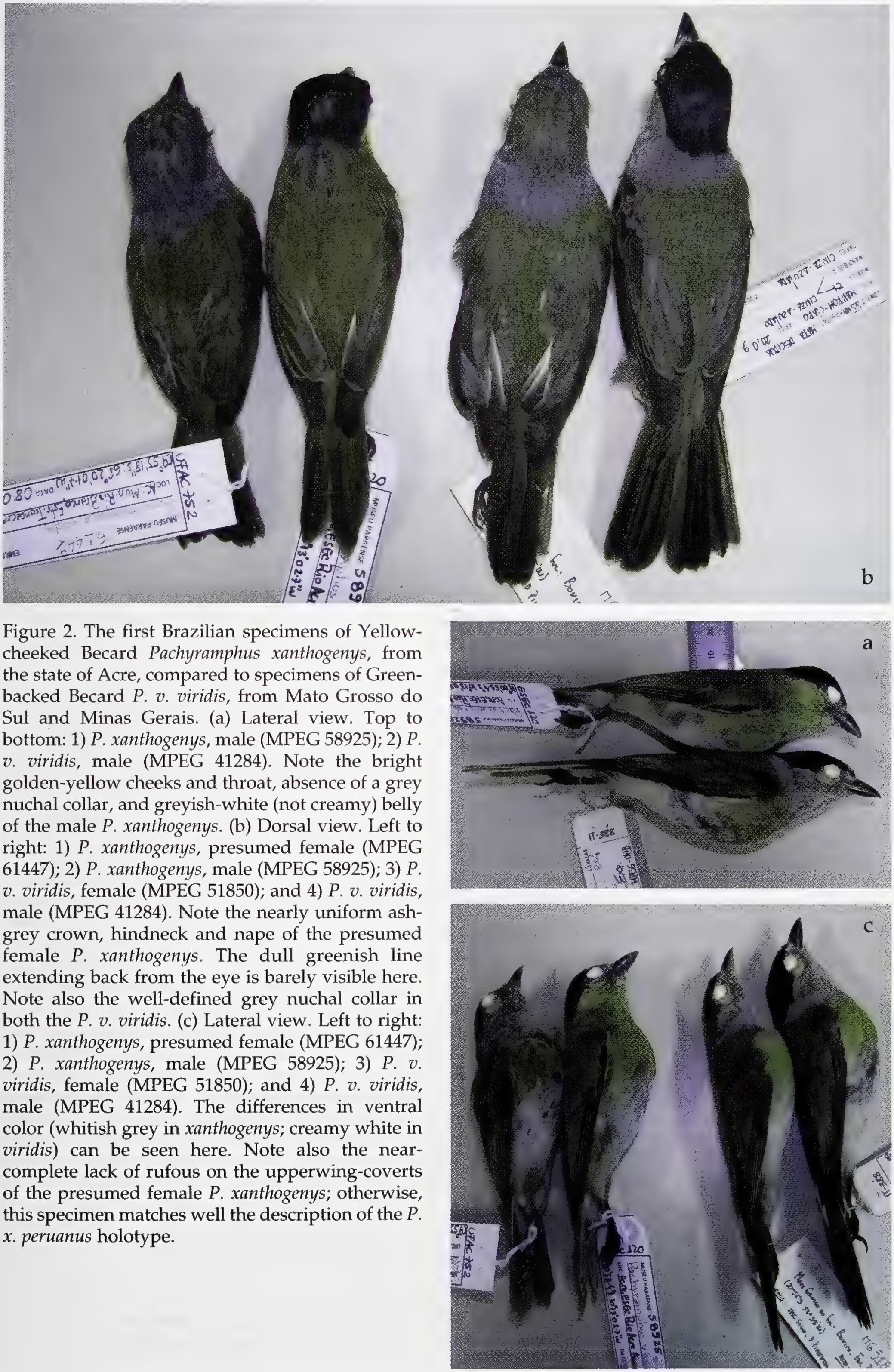

Figure 2. The first Brazilian specimens of Yellow-cheeked Becard *Pachyramphus xanthogenys*, from the state of Acre, compared to specimens of Green-backed Becard *P. v. viridis*, from Mato Grosso do Sul and Minas Gerais. (a) Lateral view. Top to bottom: 1) *P. xanthogenys*, male (MPEG 58925); 2) *P. v. viridis*, male (MPEG 41284). Note the bright golden-yellow cheeks and throat, absence of a grey nuchal collar, and greyish-white (not creamy) belly of the male *P. xanthogenys*. (b) Dorsal view. Left to right: 1) *P. xanthogenys*, presumed female (MPEG 61447); 2) *P. xanthogenys*, male (MPEG 58925); 3) *P. v. viridis*, female (MPEG 51850); and 4) *P. v. viridis*, male (MPEG 41284). Note the nearly uniform ash-grey crown, hindneck and nape of the presumed female *P. xanthogenys*. The dull greenish line extending back from the eye is barely visible here. Note also the well-defined grey nuchal collar in both the *P. v. viridis*. (c) Lateral view. Left to right: 1) *P. xanthogenys*, presumed female (MPEG 61447); 2) *P. xanthogenys*, male (MPEG 58925); 3) *P. v. viridis*, female (MPEG 51850); and 4) *P. v. viridis*, male (MPEG 41284). The differences in ventral color (whitish grey in *xanthogenys*; creamy white in *viridis*) can be seen here. Note also the near-complete lack of rufous on the upperwing-coverts of the presumed female *P. xanthogenys*; otherwise, this specimen matches well the description of the *P. x. peruanus* holotype.

fronts that often reach western Amazonia. Given that the records occurred in three different years (2002, 2005 and 2006), it is probable that *P. xanthogenys* is a regular altitudinal / austral migrant, rather than a resident in lowland Amazonia, mirroring the status of *P. viridis* in south-east Brazil, where the latter is considered an austral migrant (Willis & Oniki 2002).

A comparison of the unsexed Brazilian specimen (MPEG 61447) with the description of the *P. x. peruanus* holotype revealed that they are very similar (Hartert & Goodson 1917). *P. x. peruanus* was described from a single female collected at Chanchamayo, dpto. Cuzco, Peru, in January 1905, not far from Manu National Park and *c.*300 km south-west of Estação Ecológica do Rio Acre; its short description reads: 'Crown ash-grey, over the eyes a dull greenish line, hind-neck and nape ash-gray, rest of upper surface yellowish green as in *P. viridis*; tail and wings as in the latter, *i.e.* with a rufous patch on the upper wing-coverts. Sides of head and the throat pale gray; chest-band and sides of breast olivaceous green with yellow edges to the feathers, not uniform yellow as in *P. v. viridis* and *cuvieri*. Rest of under surface white with a greyish tinge on the breast—not creamy as in *P. v. viridis* and *cuvieri*. Wing, 73 mm' (Hartert & Goodson 1917).

MPEG 61447 fits almost exactly this description, the only exception being its near-complete lack of rufous on the upperwing-coverts, where only a discrete tinge of rufous is found on the fringes of a few feathers (Fig. 2). Given that no gonad or age-related data are available for MPEG 61447, this lone difference is not easily interpreted. Schulenberg *et al.* (2007) noted that some females of *xanthogenys* lack rufous in the wing-coverts. Interestingly, Hartert & Goodson (1917) made the following comments about the age of the holotype of *P. x. peruanus*: 'The grey head and somewhat undecided superciliary line point towards immaturity, and it is probable that the specimen—unfortunately only the one female has been received—is not fully adult, but it is not like young *P. viridis*, which agree with it only in having the top of head greyish'. In any event, both MPEG 61447 and the holotype of *P. x. peruanus* are very similar but very distinct from the female of nominate *xanthogenys*, which has a conspicuous blackish forecrown and greyish lores (Ridgely & Greenfield 2001, Mobley 2004). If either, or both, the holotype of *P. x. peruanus* and MPEG 61447 are in fact adults, *peruanus* could be diagnosed from the nominate form mainly by female head colour. More definitively sexed and aged specimens are needed to resolve this matter. Female head colour also differs between the two subspecies of the closely related *Pachyramphus viridis*: *P. v. viridis* (contrasting grey cheeks and nuchal collar) and *P. v. griseigularis* (pale green cheeks and no nuchal collar), suggesting that this could also be true of the two allopatric populations of *P. xanthogenys* (Mobley 2004).

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The authorship of *Parus ater hibernicus*

by Edward C. Dickinson & Paul Milne

Received 14 December 2007

Reference to checklists such as Kennedy *et al.* (1954) and Dickinson (2003) will supply Ogilvie-Grant as the author of *Parus ater hibernicus* (Irish Coal Tit). However, all these listings are rooted in a historical objection to recognising that priority can be accorded to names proposed in newspapers. Reference to Witherby *et al.* (1938) will show, correctly, that Ogilvie-Grant published on 31 December 1910 in this Bulletin, but that the name had appeared three days earlier in the *Daily Mail*.

The reason the newspaper was not accorded priority was not stated. It was necessary, therefore, to verify that the description provided in the *Daily Mail* article was sufficient for the purpose of establishing authorship. With the kind permission of the *Daily Mail* and General Trust we reproduce below the brief note that appeared.

NEW BRITISH BIRD

Yellow Coal-Tit found in Sligo

> Mr. Collingwood Ingram, a well-known naturalist, has discovered in the pine woods of County Sligo, Ireland, an entirely new indigenous bird to be added to the list of British birds. Such an event has not occurred for nearly fifty years.
>
> The new bird is allied to the coal-tit (*Parus ater*), which, although it is distributed throughout the world in varied forms, in no instance has a distinctive variation so pronounced as in the new species, in which the parts of the plumage that in all other coal-tits are pure white assume a clear sulphurous yellow hue. These parts are the cheeks and a spot on the back of the neck.
>
> Mr. Louis Wain, who has given *The Daily Mail* particulars of the new bird on the authority of Sir William Ingram, states that the bird's variation of colour is in no way an abnormality confined to one individual, as Mr. Ingram found all the coal-tits of the district where he made his discovery characterised in the same manner. A specimen has been examined by the Natural History Museum authorities, who have given the name *Parus Hibernicus* (Irish Tit). Mr. Ingram, who is a member of the British Ornithological Union, has already discovered several new species of birds in other parts of the world.

It will be observed that the description is quite sufficient to justify its recognition as a valid description. Witherby *et al.* (1938) also stated 'Author not clearly stated, either 'Natural History Authorities', Louis Wain, or Sir William Ingram.' That the identity of the author of the name be clear is not a requirement of the *International code for zoological nomenclature* (1999); Art. 50.1, dealing with apparent anonymity, permits internal evidence to be weighed to determine authorship. The article in the *Daily Mail* used the phrase 'on the authority of Sir William Ingram' and we consider that he must be viewed as author, having made the story available to the newspaper. Sir William was the father of Collingwood Ingram, the collector of the specimen named by Ogilvie-Grant. We therefore propose that priority be respected and that this taxon be credited to Sir William Ingram, whilst the appropriate citation for this taxon is as follows: *Parus ater hibernicus* W. Ingram, 1910 (Dec. 28), *Daily Mail*, p. 3, col. 3.

Acknowledgements
We acknowledge the assistance of Nigel T. Monaghan, Keeper, Natural History Division, National Museum of Ireland, and of Richard Schodde, Chairman of the Standing Committee on Ornithological Nomenclature.

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The etymology of *Gallinago hardwickii* (J. E. Gray, 1831), Latham's Snipe

by Murray Lord & Bob Forsyth

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Who was the Hardwicke for whom *Gallinago hardwickii* was named? Several publications, including the official Australian checklist of 1926 (RAOU 1926) and Gotch (1981), state that the name *hardwickii* honoured Maj.-Gen. Thomas Hardwicke (*c*.1760–1835). Yet a similarly extensive list, including Higgins & Davies (1996), attribute the name to Charles Hardwicke of Tasmania.

Maj.-Gen. Thomas Hardwicke is well known for his early contributions to the zoology of the Indian subcontinent. Hardwicke's life and career have been the focus of several papers, including Kinnear (1925) and Dawson (1946). He was resident in India from at least 1778 until December 1823. Thomas Hardwicke's major zoological publication was *Illustrations of Indian zoology*, co-authored by J. E. Gray of the British Museum, who named the snipe *hardwickii*.

Charles Hardwicke was born in south Lincolnshire in 1780, and arrived in Australia in 1814. He was the nephew of Maj.-Gen. Thomas Hardwicke. As a reasonably prominent citizen in early Tasmania he has been the subject of a biography (Anderson 1978). Aside of his link to the snipe, the only surviving evidence of his ornithological knowledge is in a report by him on an expedition to north-west Tasmania (quoted in Anderson 1978).

Gray (1831) states: '*Description of a new species of Snipe discovered* by Charles Hardwicke, Esq., *in Van Dieman's Land* [now Tasmania]', and goes on 'Van Dieman's Land Snipe, Scolopax hardwickii . . . '. Whilst no mention is made of Thomas Hardwicke in that passage, the Natural History Museum's Old Vellum Catalogue indicates that the specimen (Vel. Cat. 38: 73b) was presented by Thomas Hardwicke. The Old Vellum Catalogue implies there may have been a second specimen (Vel. Cat. 38: 73a), but no subsequent reference to it can be found. That Gray worked extensively with Thomas Hardwicke presumably explains why various authors have assumed the snipe was named for him. The museum's catalogue of type specimens (Warren 1966) incorrectly referred to Thomas Hardwicke as the collector as well as donor due to a transcription error, which can only have compounded confusion in the literature; Warren's own notes listed Charles Hardwicke as collector (R. Prŷs-Jones pers. comm.).

Whilst one cannot eliminate the possibility that Gray intended to name the bird for both Hardwickes, given that he specifically named Charles as the discoverer of the snipe but made no reference to Thomas' role, the available evidence rather suggests that the species was named to honour its collector.

What implication does this have for the claim, advanced in several publications, that Thomas Hardwicke visited Australia? For example, Whitley (1975) stated Thomas Hardwicke visited Tasmania and collected the snipe in 1824 en route from India to England, a date consistent with records that Thomas obtained leave of absence from India in late December 1823 (Dawson 1946).

Certainly, Thomas Hardwicke had an interest in Australian zoology. His papers in the British Library contain references to having received specimens from various Australian sources and contain lists of Australian species. Other papers of his in the Natural History Museum contain illustrations of Australian birds. He donated several Australian specimens from both New South Wales and Tasmania (R. Prŷs-Jones pers. comm.), but no evidence establishes that Thomas Hardwicke did visit Australia. Given the lack of references to Australia in extensive biographical articles on him, it appears likely Thomas Hardwicke never visited the country, and suggestions he did are a result of him being incorrectly considered the snipe's collector.

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We particularly thank Robert Prŷs-Jones for his assistance with material located in England. Penny Olsen, John Penhallurick, Colin Finney, Edward Dickinson, Gina Douglas of the Linnean Society, and Michael Walters and Alison Harding of the Natural History Museum, Tring, also provided assistance. Richard Schodde and an anonymous reviewer provided useful comments on an earlier draft of this note.

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A replacement name for *Coracina papuensis intermedia* Rothschild, 1931

by T. H. C. de Kok

Received 6 February 2008

Generic regrouping of the species of cuckooshrikes under *Coracina* Vieillot in Peters (1960: 180, 194) and Dickinson (2003: 467, 470) has duplicated the species-group name *intermedia*, creating secondary homonymy (ICZN 1999, Arts. 53.3, 57.3.1). The senior name is *Coracina melaschistos intermedia* (Hume, 1877) for the central and southern Chinese form of the Black-winged Cuckooshrike, and the invalid junior name under Art. 59.1 is *Coracina papuensis intermedia* Rothschild, 1931, for the south-west New Guinean population of the White-bellied Cuckooshrike. No other names are available for the south-west New Guinea population, and accordingly I propose for it:

Coracina papuensis rothschildi, nom. nov.

As a replacement name for *Coracina papuensis intermedia* Rothschild, this new name takes the type of *intermedia* Rothschild. It should be noted that this form is questionably distinct, Mees (1982) and LeCroy (2003) regarding it as consubspecific with nominate *C. p. papuensis*. Its minimal colour differences could well be caused by age, dirt or simply clinal variation.

Acknowledgements
I gratefully acknowledge the assistance of John Penhallurick, Alan P. Peterson, Dick Schodde and Edward Dickinson.

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First nest and egg records of Peruvian Plantcutter *Phytotoma raimondii*, by O. D. Boggs

by Jeremy N. M. Flanagan & Brad Millen

Received 11 February 2008

Peruvian Plantcutter *Phytotoma raimondii* is endemic to the dry forests of coastal northern Peru in dptos. Piura, Lambayeque, Cajamarca, La Libertad, Ancash and Lima. Through a review of specimen material at the Royal Ontario Museum (ROM), Toronto, we are able to provide the first description of its nest and eggs, based on the collection of O. D. Boggs, a Canadian geologist who worked in the Talara oilfields of north-west Peru in the 1930s (McNicholl & Cranner-Byng 1994). His work took him to Peru and Ecuador several times in 1926–39 and Colombia in 1945–46, during which he collected a total of 637 bird skins and 124 eggs, all deposited at the ROM, with a few at the Natural History Museum, Tring, UK (M. P. Adams pers. comm.).

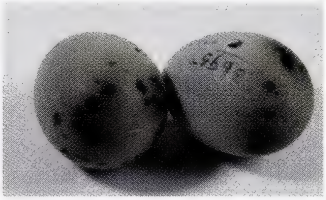

Figure 1. Eggs of Peruvian Plantcutter *Phytotoma raimondii* taken near Peru, north-west Peru, held at the Royal Ontario Museum, Toronto (Brad Millen)

Boggs collected two clutches belonging to Peruvian Plantcutter, with the following information adapted from his specimen labels: Clutch 1—*Locality*: Near Talara, Peru (04°33′S 81°13′W; elevation 82 m. *Date*: 27 March 1934. *Eggs*: two, incomplete clutch. *Incubation*: fresh. *Identity:* female taken [ROM 36.7.20.12]. *Nest*: *c*.2 m up in a small algarroba tree. *Remarks:* one fully developed egg similar to others found in oviduct of female. Clutch 2—*Locality:* Near Talara, Peru (coordinates and elevation as previous). *Date*: 4 April 1934. *Eggs*: three, complete clutch. *Incubation*: advanced. *Identity*: both birds seen; male collected but not preserved. *Nest*: a frail, shallow affair of twigs, *c*.2.5 m up near the centre of a small, dead, algarroba tree. Eggs visible from below. *Remarks*: male had very little red on the forehead.

Measurements of the five eggs taken by the authors give a mean length of 24.17 mm and mean width at circum of 19.13 mm. They are short oval to subelliptical and smooth with a slight gloss, light drab to drab varying to greyish olive, with fine to coarse dark brownish-olive flecks at the larger end. Some fading can be assumed due to time in storage.

Counting the egg found in the oviduct, clutch size for both nests was three eggs, assuming the females had completed ovulation. The algarroba trees mentioned would be *Prosopis* sp., probably *Prosopis pallida*, the commonest species in coastal north-west Peru.

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Mark Adams (Natural History Museum, Tring), Todd Mark and Tom Schulenberg are thanked for their assistance. This paper is an output of the DEFRA / Darwin Initiative funded project *DarwinNet—The Peru / Ecuador Dry Forest Clearing-house Mechanism.*

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On some generic names amongst the Bucconidae (puffbirds)

by John Penhallurick

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Rasmussen & Collar (2002) made several changes to the taxonomy and nomenclature of the Bucconidae. An important change occurred in their treatment of taxa formerly assigned to the genus *Bucco* Brisson, 1760 (as in Peters 1948, Howard & Moore 1980 and Dickinson 2003). They stated (p. 104): 'The most perplexing problem at the generic level involves the Collared Puffbird, which in bill shape and colour, as well as plumage pattern, is closer to species of *Nystalus* than to other members of an expanded genus *Bucco*. Since it is the type species of the genus and family, however, it cannot be removed from the genus *Bucco*. Resurrection of generic names in former widespread usage, until they were all placed in *Bucco* by J. L. Peters provides an interim solution to the problem, pending further study.'

Incidentally, P. L. Sclater (1891) placed all of these taxa in *Bucc*, long before Peters (1948). Nonetheless, Rasmussen & Collar's reasoning seems sound. As a result, *Bucco* becomes a monotypic genus, containing only Collared Puffbird *Bucco capensis* Linnaeus, 1766. Similarly, their removal to *Nystactes* Gloger, 1827, of Spotted Puffbird *Nystactes tamatia* (J. F. Gmelin, 1788), and Sooty-capped Puffbird *Nystactes noanamae* (Hellmayr, 1909), is uncontroversial.

However, in adopting *Argicus* Cabanis & Heine, 1863, *Museum Heineanum* 4(1): 148, for *Cyphos macrodactylus* von Spix, 1824, Rasmussen & Collar (2002) seem to have discarded another earlier available name: *Cyphos* von Spix, 1824, *Avium species novae, quas in itinere per Brasiliam annis 1817–20 collegit et descripti*, 1: 51 (type, by monotypy, *Cyphos macrodactylus* von Spix, 1824). Peters (1948: 12) has recorded under *Argicus* Cabanis & Heine, in the synonymy of *Bucco* Brisson, that *Cyphos* von Spix, 1824, was a junior homonym of *Cyphus* Schönherr, 1823. But, under the Code's (ICZN 1999) one-letter-difference rule (Art. 56.2), *Cyphus* Schönherr, 1823, does not pre-occupy *Cyphos* von Spix, 1824. As *Argicus* Cabanis & Heine is hardly in widespread use, having apparently last been used by Chapman (1926) outside synonymies, *Cyphos* von Spix should replace it under the normal course of priority. Thus the scientific name of the Chestnut-capped Puffbird becomes *Cyphos macrodactylus* von Spix, 1824.

Acknowledgements

Thanks to Dick Schodde for his opinion regarding the principles of Prevailing Usage and Priority.

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The gender of genera ending in *-oenas*

by Normand David & Steven M. S. Gregory

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Many avian genus-group names have been formed from the feminine Greek word οινας [wild pigeon]. Some, like *Oena*, *Reinwardtoena* and *Turacoena*, are Latinised with a change of ending [-ας to *-a*], here indicative of the feminine gender (ICZN 1999, Art. 30.1.3) that is correctly reflected by current combinations (Peters 1937, Dickinson 2003).

Names ending in *-oenas* (this is not the transliterated *-oinas*, to be treated under Art. 30.1.2) are also Latinised, but this ending is *not* indicative of a particular gender under Art. 30.1.3. In such cases, the gender must be determined under Art. 30.1.4.2: a name that ends in *-oenas* is masculine unless its author, in the original work, stated that it is feminine or combined it with an adjectival species-group name in the feminine form.

Table 1 shows the grammatical gender of the generic names ending in *-oenas* that are to be encountered within Peters (1937), Wolters (1975) and Dickinson (2003). A considerable number of other avian generic names ending in *-oenas* are to be found as subgenera or junior synonyms in other works, but they are not treated here.

TABLE 1
Gender of generic names ending in *-oenas* as found in Peters (1937), Wolters (1975), and Dickinson (2003).

Genus-group name	Original combination	Gender
Alectroenas G. R. Gray, 1840	*A. franciae*	**Masc.**
Alopecoenas Sharpe, 1899	*A. hoedti*	**Masc.**
Caloenas G. R. Gray, 1840	*C. nicobarica*	**Fem.**
Chloroenas Reichenbach, 1853	*C. monilis*	**Masc.**
Compsoenas Riley, 1921	*C. radiata*	**Fem.**
Coryphoenas Wardlaw Ramsay, 1890	*C. crassirostris*	**Masc.**
Janthoenas Reichenbach, 1853	*J. janthina*	**Fem.**
Lepidoenas Reichenbach, 1853	*L. speciosa*	**Fem.**
Lithoenas Reichenbach, 1853	*L. livia*	**Fem.**
Nesoenas Salvadori, 1893	*N. mayeri*	**Masc.**
Notioenas Ridgway, 1915	No combination	**Masc.**
Oenoenas Salvadori, 1893	No combination	**Masc.**
Patagioenas Reichenbach, 1853	*P. leucocephala*	**Fem.**
Starnoenas Bonaparte, 1838	*S. cyanocephala*	**Fem.**
Taenioenas Reichenbach, 1853	*T. albitorques*	**Masc.**
Zonoenas Reichenbach, 1853	*Z. mülleri*	**Masc.**

Some Latinised names having identical final components are not necessarily of the same gender, as shown by the treatment of genera in section 7c (see in particular those ending in *-myias,* from the Greek μυια) of David & Gosselin (2002). Of the genus-group names in Table 1 that Dickinson (2003) used as valid, two—*Alectroenas* and *Nesoenas*—must be treated as masculine (instead of feminine), and of all the species-group names combined with them only two require a mandatory gender ending change (Arts. 31.2, 34.2) as follows: *Alectroenas nitidissimus* and *Alectroenas pulcherrimus*.

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